Project Engineering Management

Bharat Heavy Electricals Limited

(A Govt. Of India Undertaking)

Ref. Enquiry No.: PE/PG/PA1/E-6728/2021 dt. 11/08/2021

DUE DATE
21/08/2021
BY 02:00 P.M.

Dear Sir / Madam,

Subject: Tender Enquiry for "DC BATTERY CHARGER" as per Technical Specification No. PE-TS-434-508-E002 - Rev. 00 for 3X800 MW PVUNL PATRATU TPP PHASE-I.

BHEL invites your offer for design, manufacture, inspection and testing at manufacturer's works, proper packing & delivery to site of **DC BATTERY CHARGER** conforming to the specification.

Your best quotation / offer shall be submitted in two parts strictly as per Clause-2.0 of the "**Instructions to Bidders**" of GCC, Rev. 07, in line with our terms and conditions, online via e-procurement system on **https://eprocurebhel.co.in/nicgep/app.**

S. No.	PROJECT	ITEM DESCRIPTION	TECHNICAL SPECIFICATION NO.
1.	3X800 MW PVUNL PATRATU TPP PHASE-I	DC BATTERY CHARGER	PE-TS-434-508-E002 - Rev. 00

It shall be the responsibility of the bidder to ensure that the tender is submitted **on or before the due date** by **02:00 P.M.** Part-I bids shall be opened at **04:30 P.M.** on the due date.

Note: 1. Detailed Tender documents / Corrigenda, addenda, amendments, time extensions, clarifications etc. can be downloaded / accessed from the following websites: -

a. https://eprocurebhel.co.in/nicgep/app
b. www.bhel.com
c. www.bhelpem.com

ENQUIRY TERMS AND CONDITIONS:

Please refer GCC, Rev. 07 which is available on **https://www.bhelpem.com/Documents/GCC/GCCRev07.pdf**. Bidders are requested to go through the same while submitting the offer.

1. Offers should be submitted separately in two parts **online through e-procurement system** as follows:
   Part-I: TECHNO-COMMERCIAL BID **Part-II: PRICE BID**
   For detailed instructions, please see Clause No. 1.0 & 2.0 of "Instructions to Bidders (Vol-I, GCC Rev. 07)".

2. Bidders to note that following form the part of tender documents & will become a part of the Order / Contract after its finalisation:
   a. General Conditions of Contract (GCC), Rev. 07 comprising of Instructions to Bidders and General Commercial Terms & Conditions.
   b. Technical Specification.
   c. Special Conditions of Contract (SCC, Rev. 00).

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d. NTPC's Main & Sub-supplier questionnaire.
e. Enquiry Letter with Terms & Conditions.
f. Technical PQR.
g. Format for Local Content Certification.

3. Tenders shall be submitted strictly in accordance with the requirements of the above mentioned tender documents. Deviations (Technical as well as Commercial), if any, shall be listed out separately in Annexure-II (Cost of withdrawal) of GCC, Rev. 07 along with reasons for taking such deviations. Any deviations (Technical as well as Commercial) not mentioned in the Annexure-II (Cost of withdrawal) and standard pre-printed terms & conditions shown separately or found hidden in the offer, will not be taken cognizance of. Bidders to note all the points mentioned in "Notes" of Annexure-II to GCC, Rev. 07.

4. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any / all tender(s) in part or full without assigning any reason whatsoever.

5. For this procurement, the local content to categorize a supplier as a Class I Local Supplier / Class II Local Supplier / Non Local supplier and Purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), (PPP-MII) Order 2017 dt. 04/06/2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

   Regarding verification of local content, the local supplier at the time of tender, bidding or solicitation shall be required to provide certification as per para 9 of PP-MII order revision dt. 16.09.2020.

6. Bidders has to ensure compliance to Ministry of Power (MoP) Order No. 25-11/6/2018-PG dt. 02/07/2020 & Order No. 11/05/2018-Coord. dt. 23/07/2020, if applicable & Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020 including subsequent orders, if any.

7. Bidder has to submit "Model Certificate for Tenders" as per Annexure-III of Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020 including subsequent orders, if any.

8. **Only Class-I Local Suppliers are eligible to bid in this tender.**

9. As per Department of Expenditure (DoE) OM No. 6/9/2020-PPD dt. 24/08/2020, it is mandatory for all the bidders to provide their GeM Seller ID.

10. Prices shall be firm till completion of the contract.

11. All correspondence thereof, shall be addressed to the following:

NIMESH MALLIK, DY. ENGR., PG-III	**SWAPNIL KUMAR, MGR., PG-III**
E-MAIL: nimeshmallik@bhel.in	**E-MAIL: swapnilkumar@bhel.in**
Ph. No. +91-120-4368799; Mob: +91-9654713649	**Ph. No. +91-120-4213563; Mob: +91-9953160482**

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12. **Bidder to note that this is a conditional Open (Indian) Tender enquiry. Hence, Reverse Auction (Part-II) shall be subject to following: -**
    i. Techno-commercial qualification / recommendation of bidder by BHEL-PEM.
    ii. Approval of bidder by Customer: - Approval shall be taken up by BHEL with customer based on the credentials / reference list. Hence, Bidders are requested to submit the following (as part of their credentials) on or before Part-I opening: -
        - Reference list indicating P.O. details, customer name, P.O. date, execution date etc.
        - Performance certificate issued by the clients.
        - NTPC's Main & Sub-supplier questionnaire (enclosed with enquiry) and submit all the supportive documents against details furnished therein (signed & stamped on each page)
    iii. **Pre-Qualifying Requirements: -** Bids of only those bidders shall be evaluated who meet the Technical pre-qualifying requirements.

    Bidders to ensure that Third party / customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document / certificate issuing authority such as name & designation of Issuing Authority and its organisation contact number and e-mail Id etc. In case the same found not available, Purchaser has right to reject such document from evaluation.

13. For the bidders (who are not registered with BHEL-PEM), Online Registration Portal is operational in BHEL. Non-registered Vendors, who wish to apply for registration with BHEL-PEM, have to apply through Online Registration Portal available at www.bhelpem.com→vendor section→Online Supplier Registration. All credentials and/or documents duly signed and stamped related to registration has to be uploaded on the website and submit the application for registration. One set of hard copy of the filled-up SRF downloaded from Online Registration Portal duly signed and stamped has to be submitted.

14. The nature of package is "Non-divisible.

15. The Evaluation Currency for this tender will be INR.

16. BHEL shall be finalizing this tender with Reverse Auction. Bidders to quote suitably. Bidders to note that this clause will supersede Cl. No. 13 of 'Instruction to Bidders' of GCC-Rev. 07.

    "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

17. MSME / Start-up Vendors to submit applicable documents along with their offer for availing the benefits as per GOI guidelines. Further PEM is already registered with RXIL (TReDS) Platform. You are requested to get registered with RXIL (TReDS) Platform to avail the facility as per GOI guidelines.

18. Overall (%) variation in contract values (due to changes in the scope) shall be limited to +/- 5%. This will prevail over the quantity variation Cl. No. 6.0 of GCC, Rev. 07.

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19. **Delivery Schedule: -** Unit-wise Quantity break-up shall be as per Annexure-I.

a) Main Supply for Unit-I: - Within Six (06) months from date of CAT-I approval of "PRIMARY" drawings / documents subject to drawing / document submission / re-submission schedule as follows: -

BHEL Drawing No.	Drawing Title	Primary / Secondary	BHEL Inputs	Drawing / document submission / re-submission schedule
PE-V0-XXX-508-E001	TDS FOR BATTERY CHARGER	Primary		R-0 within 14 days from PO & subsequent revisions within 10 days of comments received from BHEL. BHEL shall furnish comments / approval on each submission within 18 days from receipt.
PE-V0-XXX-508-E002	GA AND INTERNAL LAYOUT DRAWING FOR BATTERY CHARGER	Primary		
PE-V0-XXX-508-E003	SCHEMATIC/ POWER CIRCUIT DIAGRAM FOR BATTERY CHARGER	Primary		
PE-V0-XXX-508-E004	BOM WITH MAKE OF COMPONENTS FOR BATTERY CHARGER	Primary		
PE-V0-XXX-508-E011	SIZING CALCULATION OF TRANSFORMER, RECTIFIER, THYRISTOR, FILTER AND FUSE FOR BATTERY CHARGER	Primary		
PE-V0-XXX-508-E901	QUALITY PLAN FOR BATTERY CHARGER	Primary		
PE-V0-XXX-508-E017	LIST OF MANDATORY SPARES FOR BATTERY CHARGER	Primary (for MS)		
PE-V0-XXX-508-E005	CIRCUIT DIAGRAM AND GA OF BATTERY FUSE BOX	Primary		
PE-V0-XXX-508-E006	CIRCUIT DIAGRAM AND GA OF BATTERY DISCHARGE PANEL	Primary		
PE-V0-XXX-508-E018	TYPE TEST CERTIFICATES FOR BATTERY CHARGER	Secondary		R-0 within 30 days from PO & subsequent revisions within 10 days of comments received from BHEL. BHEL shall furnish comments / approval on each submission within 18 days from receipt.
PE-V0-XXX-508-E016	LIST OF O&M SPARES FOR BATTERY CHARGER	Secondary		
PE-V0-XXX-508-E015	LIST OF E & C SPARES FOR BATTERY CHARGER	Secondary		
PE-V0-XXX-508-E007	OPERATIONAL WRITE UP FOR BATTERY CHARGER	Secondary		
PE-V0-XXX-508-E019	O&M MANUAL FOR BATTERY CHARGER	Secondary		within 30 days of issuance of MDCC.

In case of any delay in submission / re-submission of "PRIMARY" drawings / documents, then same shall be reduced from the given delivery period. Delay in BHEL's comments / approval beyond 18 days shall also be considered for delay analysis.

b) Main Supply for Unit-II & III: - Four (04) months from the date of BHEL clearance for respective units.

c) Mandatory Spares: - Three (03) months from the date of manufacturing clearance by BHEL.

d) Supervision of Erection & Commissioning: - Vendor to depute its service engineer for respective site activity within 15 days from BHEL's intimation (for deputing service engineer) for such site activity.

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Further, following to be noted: -
a) The end period specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.
b) The delivery conditions specified are for contractual LD purposes, however, BHEL may ask for early deliveries without any compensation thereof.
c) Non-applicable drawings shall be decided during bid evaluation.
d) Wherever schedule of drawings / documents submission / re-submission is stipulated in the Technical Specifications, same shall be superseded by delivery specified in NIT.

20. MSME bidders will have to furnish the UAM details.

21. Bidders are requested to refer Performance Bank Guarantee (PBG) format & rules in line with GCC, Rev. 07 and adhere to it while furnishing PBG. In case any benefit with respect to BG reduction is provided by the end customer for Patratu project, then similar benefit shall be passed onto the bidders for subject tender as well.

22. Bidder agrees to submit performance security required for execution of the contract within the time period mentioned. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered from the bills along with due interest.

23. Lump sum Evaluation shall be done on Total Cost to BHEL basis (excluding GST).

24. The offers of the bidders who are on the banned list (list of banned firms available on http://www.bhel.com) and also the offers of the bidders, who engage the services of the banned firms, shall be rejected.

25. The Bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

26. Bidders participating in subject tender will necessarily have to buy class III DSCs (Digital Signature Certificate) issued by the certifying authorities in India. Basic procedure /checklist is uploaded on “www.bhel.com” for participating in tender enquires through e-procurement.

27. This item/package/system falls under the list of items defined in Para 3 of Ministry of Finance guidelines dt. 20.09.2016 (procurement of items related to public safety, health, critical security operations and equipment etc.) & hence criteria of prior experience / turnover shall be same for all the bidders including startup / MSME.

28. Bidders to declare that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

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In case, the bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies / guidelines.

29. **Due to COVID-19 pandemic condition prevailing in the country, BHEL-PEM may go for Remote Inspection of offered items, if required. Vendors are requested to be equipped with the facilities / gadgets as indicated in the guidelines attached to take up the inspection REMOTELY.**

30. Wherever Service charges like Supervision, Inspection etc. consequent or incidental to supply are envisaged in tender, such charges should not exceed 2% of the total contract value.

31. All terms and conditions shall be as per NIT, SCC of project and GCC - Rev. 07. In the event of any contradiction, the terms and conditions mentioned, the order of preference shall be as mentioned in Cl. No. 36 of GCTC of GCC - Rev. 07.

32. Please note that for technical bid, detailed offers are to be submitted including the following: -
    - Acceptance of GCC, Rev. 07 & Special Conditions of Contract (SCC).
    - Along with your offer, please submit a copy of this letter duly signed & stamped on each page as token of acceptance of all terms & instructions conveyed.
    - Technical PQR documents.
    - Local Content Certification.
    - NTPC's Main & Sub-Supplier Questionnaire.

Thanking You.

Yours Sincerely,

SWAPNIL KUMAR

Digitally signed by SWAPNIL KUMAR
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, ou=BHEL / PS-PEM- Noida, postalCode=201301, st=Uttar Pradesh, 2.5.4.20=0cdbbbf5acf39f5fbaf3cba5ef57c2a560cb29d2207012b200ef1ed2c2fd050a, cn=SWAPNIL KUMAR
Date: 2021.08.11 15:16:45 +05'30'

Swapnil Kumar
(Manager / PG-III / BHEL-PEM)

Enclosures:

1. Technical Specification No. PE-TS-434-508-E002 - Rev. 00.
2. Project SCC, Rev. 00.
3. Technical PQR.
4. NTPC's Main & Sub-supplier questionnaire.
5. Format for Local Content Certification.
6. Guidelines for Remote Inspection.

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3 x 800 MW PATRATU STP

BOQ CUM PRICE SCHEDULE

ANNEXURE-I

S. No.	Item code	Item Description	Unit	Total Quantity	UNIT-1 QUANTITY	UNIT-2 QUANTITY	UNIT-3 QUANTITY	HSN CODE	Remarks
1	**508-12010-A**	220V FLOAT-CUM-BOOST CHARGER1, 220V DC, 550A (MAIN PLANT)	NOS	6	2	2	2	8504	
2	**508-12011-A**	220V FLOAT-CUM-BOOST CHARGER2, 220V DC, 50A (RWPH)	NOS	2	2	0	0	8504	
3	**508-12001-A**	**BATTERY FUSE BOX**							
3.1		BATTERY FUSE BOX (MAIN PLANT)	NOS	6	2	2	2	8504	BATTERY FUSE BOX OF ADEQUATE RATING AS PER LOAD DUTY CYCLE (ANNEXURE-II OF SPECIFICATION). **MINIMUM RATING 1250A.**
3.2		BATTERY FUSE BOX (RWPH/ FOPH)	NOS	2	2	0	0	8504	BATTERY FUSE BOX OF ADEQUATE RATING AS PER LOAD DUTY CYCLE (ANNEXURE-II OF SPECIFICATION). **MINIMUM RATING 50A.**
		TOTAL OF 4 i.e. (4.1+4.2+4.3)							
4	**508-12005-A**	**DISCHARGE RESISTOR**							
4.1		DISCHARGE RESISTOR (MAIN PLANT)	NOS	1	1	0	0	8504	DISCHARGE RESISTOR WITH SHUNT SUITABLE FOR 5HRS DISCHARGE RATE FOR 1600AH NI-CD BATTERY (TWO BANKS IN PARALLEL)/ 3210AH LEAD ACID BATTEY ((TWO BANKS IN PARALLEL)
4.2		DISCHARGE RESISTOR (RWPH PLANT)	NOS	1	1	0	0	8504	DISCHARGE RESISTOR WITH SHUNT SUITABLE FOR 5HRS DISCHARGE RATE FOR 90AH NI-CD BATTERY (SINGLE STRING)/ 150AH LEAD ACID BATTEY ((TWO BANKS IN PARALLEL)
5	**508-12006-A**	**E & C SPARES**							
5.1		E & C SPARES FOR FLOAT CUM BOOST CHARGER (MAIN PLANT) AT BOQ S.	SET	1					
5.1.1		FUSE LINK WITHOUT HOLDER							
a		AC I/P HRC FUSE LINK	NOS	12	4	4	4	8504	
b		GLASS FUSE	NOS	12	4	4	4	8504	
c		CONTROL HRC FUSE LINK	NOS	12	4	4	4	8504	
d		RECTIFIER FUSE LINK	NOS	12	4	4	4	8504	
e		FILTER CAPACITOR FUSE LINK	NOS	12	4	4	4	8504	
f		DC O/P FUSE LINK	NOS	12	4	4	4	8504	
5.1.2		INDICATING LAMP							
a		AC I/P LAMP RED COLOR	NOS	12	4	4	4	8504	
b		AC I/P LAMP YELLOW COLOR	NOS	12	4	4	4	8504	
c		AC I/P LAMP BLUE COLOR	NOS	12	4	4	4	8504	
d		DC O/P LAMP	NOS	12	4	4	4	8504	
5.2		E & C SPARES FOR FLOAT CUM BOOST CHARGER (RWPH) AT BOQ S. NO. 2	SET	1					
5.2.1		FUSE LINK WITHOUT HOLDER							
a		AC I/P HRC FUSE LINK	NOS	6	6	0	0	8504	
b		GLASS FUSE	NOS	6	6	0	0	8504	
c		CONTROL HRC FUSE LINK	NOS	6	6	0	0	8504	
d		RECTIFIER FUSE LINK	NOS	6	6	0	0	8504	
e		FILTER CAPACITOR FUSE LINK	NOS	6	6	0	0	8504	
f		DC O/P FUSE LINK	NOS	6	6	0	0	8504	
5.2.2		INDICATING LAMP							
a		AC I/P LAMP RED COLOR	NOS	6	6	0	0	8504	
b		AC I/P LAMP YELLOW COLOR	NOS	6	6	0	0	8504	
c		AC I/P LAMP BLUE COLOR	NOS	6	6	0	0	8504	
d		DC O/P LAMP	NOS	6	6	0	0	8504	
6	**508-12020-A**	**SUPERVISION OF E&C (Including Tests on all battery chargers to be carried out at Site on completion of E & C and immediately prior to putting in service)**							
6.1		LUMP SUM CHARGES PER VISIT FOR ENGINEER (EXCEPT DAILY CHARGES)	VISIT	7	3	2	2	9987	
6.2		LUMP SUM DAILY CHARGES FOR ENGINEER	DAYS	28	12	8	8	9987	

3 x 800 MW PATRATU STP

BOQ CUM PRICE SCHEDULE

S. No.	Item code	Item Description	Unit	Total Quantity	UNIT-1 QUANTITY	UNIT-2 QUANTITY	UNIT-3 QUANTITY	HSN CODE	Remarks
7	**508-12000-B**	**MANDATORY SPARES**							
7.1		MANDATORY SPARES FOR FLOAT CUM BOOST CHARGER (MAIN PLANT-550A) AT BOQ S. NO. 1	SET	1					
a		SET OF ELECTRONIC CARDS/ MODULES		1 set of each type & rating	0	0	1 set of each type & rating	8504	
b		SET OF AUXILIARY RELAYS		1 set of each type & rating	0	0	1 set of each type & rating	8504	
c		SET OF FUSE LINKS & GLASS FUSES		3 set of each type & rating	0	0	3 set of each type & rating	8504	
d		SET OF SCR & DIODE		3 set of each type & rating	0	0	3 set of each type & rating	8504	
e		RECTIFIER TRANSFORMER		1 No. of each type & rating	0	0	1 No. of each type & rating	8504	
f		CONTROL TRANSFORMER		1 No. of each type & rating	0	0	1 No. of each type &	8504	
7.2		MANDATORY SPARES FOR FLOAT CUM BOOST CHARGER (RWPH- 50**A**) AT BOQ S. NO. 2	SET	1					
a		SET OF ELECTRONIC CARDS/ MODULES		1 set of each type & rating	0	0	1 set of each type & rating	8504	
b		SET OF AUXILIARY RELAYS		1 set of each type & rating	0	0	1 set of each type & rating	8504	
c		SET OF FUSE LINKS & GLASS FUSES		3 set of each type & rating	0	0	3 set of each type & rating	8504	
d		SET OF SCR & DIODE		3 set of each type & rating	0	0	3 set of each type & rating	8504	
e		RECTIFIER TRANSFORMER		1 No. of each type & rating	0	0	1 No. of each type &	8504	
f		CONTROL TRANSFORMER		1 No. of each type & rating	0	0	1 No. of each type &	8504	

NOTES :

1) AMOUNT PAYABLE FOR ENGINEER PER VISIT TO SITE = VISIT CHARGES AS PER SL. NO. 7.1 ABOVE + (DAILY CHARGES AS PER SL. NO. 7.2 ABOVE X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE).

2) THE VISIT CHAGRES SHALL BE INCLUSIVE OF CHARGES OF AIR FARE/TRAIN FARE , BOARDING/LODGING, LOCAL CONVEYANCE, MEDICAL , INSURANCE ETC.

3) SITE VISIT CHARGES SHALL BE APPLICABLE FOR ANY VISIT MADE BY VENDOR AT SITE AFTER RECEIVING THE INSTRUCTION FROM BHEL FOR DEPUTATION OF VENDOR REPRESENTATIVE. THE VISIT CAN BE CALLED FOR SUPERVISION OF COMMISSIONING & TESTING ETC.

4) ALL CABLE GLANDS & LUGS AT CHARGER, FUSE BOX & DISCHARGE RESISTOR END ARE IN BIDDER'S SCOPE.

Validate | Print | Help

Item Rate BoQ

Tender Inviting Authority: Bharat Heavy Electricals Limited-Project Engineering Management, Noida

Name of Work: BOQ cum PRICE SCHEDULE OF MAIN SUPPLY OF DC BATTERY CHARGER FOR 3X800 MW PVUNL PATRATU TPP PHASE-I

Tender Enquiry No.: PE/PG/PA1/E-6728/2021 dt. 11/08/2021

Name of the Bidder/ Bidding Firm / Company :	

NOTES:

1) ALL CABLE GLANDS & LUGS AT CHARGER, FUSE BOX & DISCHARGE RESISTOR END ARE IN BIDDER'S SCOPE.

NUMBER #	TEXT #	TEXT #	NUMBER #	TEXT #	NUMBER	TEXT #	NUMBER #	NUMBER	NUMBER	NUMBER	TEXT	NUMBER	NUMBER	NUMBER #	NUMBER #	TEXT #
S. No.	Item Description	Remarks for Item Description	Quantity	Units	HSN Code	Quoted Currency in INR / Other Currency	UNIT EX-WORKS PRICE In Figures To be entered by the Bidder	TOTAL EX-WORKS PRICE	FREIGHT RATE	FREIGHT AMOUNT	GST TYPE	GST RATE	GST AMOUNT	TOTAL AMOUNT Without Taxes TOTAL EX-WORKS + FREIGHT)	TOTAL AMOUNT With Taxes (TOTAL EX-WORKS + FREIGHT + GST)	TOTAL AMOUNT In Words
1	2	3	4	5	7	12	13	14	15	16	18	20	21	53	54	55
1.11	220V FLOAT-CUM-BOOST CHARGER1, 220V DC, 550A (MAIN PLANT)		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.12	220V FLOAT-CUM-BOOST CHARGER2, 220V DC, 50A (RWPH)		2	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.13	BATTERY FUSE BOX (MAIN PLANT)	BATTERY FUSE BOX OF ADEQUATE RATING AS PER LOAD DUTY CYCLE (ANNEXURE-II OF SPECIFICATION). MINIMUM RATING 1250A.	6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.14	BATTERY FUSE BOX (RWPH / FOPH)	BATTERY FUSE BOX OF ADEQUATE RATING AS PER LOAD DUTY CYCLE (ANNEXURE-II OF SPECIFICATION). MINIMUM RATING 50A.	2	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.15	DISCHARGE RESISTOR (MAIN PLANT)	DISCHARGE RESISTOR WITH SHUNT SUITABLE FOR 5 HRS. DISCHARGE RATE FOR 1600AH NI-CD BATTERY (TWO BANKS IN PARALLEL) / 3210AH LEAD ACID BATTERY (TWO BANKS IN PARALLEL)	1	No.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.16	DISCHARGE RESISTOR (RWPH PLANT)	DISCHARGE RESISTOR WITH SHUNT SUITABLE FOR 5 HRS. DISCHARGE RATE FOR 90AH NI-CD BATTERY (SINGLE STRING) / 150AH LEAD ACID BATTEY (TWO BANKS IN PARALLEL)	1	No.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2	**E & C SPARES FOR FLOAT CUM BOOST CHARGER (MAIN PLANT)**															
2.11	FUSE LINK WITHOUT HOLDER - AC I/P HRC FUSE LINK		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.12	FUSE LINK WITHOUT HOLDER - GLASS FUSE		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.13	FUSE LINK WITHOUT HOLDER - CONTROL HRC FUSE LINK		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.14	FUSE LINK WITHOUT HOLDER - RECTIFIER FUSE LINK		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.15	FUSE LINK WITHOUT HOLDER - FILTER CAPACITOR FUSE LINK		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.16	FUSE LINK WITHOUT HOLDER - DC O/P FUSE LINK		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.17	INDICATING LAMP - AC I/P LAMP RED COLOR		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.18	INDICATING LAMP - AC I/P LAMP YELLOW COLOR		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.19	INDICATING LAMP - AC I/P LAMP BLUE COLOR		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.20	INDICATING LAMP - DC O/P LAMP		12	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3	**E & C SPARES FOR FLOAT CUM BOOST CHARGER (RWPH)**															
3.11	FUSE LINK WITHOUT HOLDER - AC I/P HRC FUSE LINK		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.12	FUSE LINK WITHOUT HOLDER - GLASS FUSE		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.13	FUSE LINK WITHOUT HOLDER - CONTROL HRC FUSE LINK		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.14	FUSE LINK WITHOUT HOLDER - RECTIFIER FUSE LINK		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.15	FUSE LINK WITHOUT HOLDER - FILTER CAPACITOR FUSE LINK		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.16	FUSE LINK WITHOUT HOLDER - DC O/P FUSE LINK		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.17	INDICATING LAMP - AC I/P LAMP RED COLOR		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.18	INDICATING LAMP - AC I/P LAMP YELLOW COLOR		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.19	INDICATING LAMP - AC I/P LAMP BLUE COLOR		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
3.20	INDICATING LAMP - DC O/P LAMP		6	Nos.	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
Total in Figures														0.000	0.000	INR Zero Only
Quoted Rate in Words		INR Zero Only														

Validate Print Help

Item Rate BoQ

Tender Inviting Authority: Bharat Heavy Electricals Limited-Project Engineering Management, Noida

Name of Work: BOQ cum PRICE SCHEDULE OF MANDATORY SPARES OF DC BATTERY CHARGER FOR 3X800 MW PVUNL PATRATU TPP PHASE-I

Tender Enquiry No.: PE/PG/PA1/E-6728/2021 dt. 11/08/2021

Name of the Bidder/ Bidding Firm / Company :															
MANDATORY SPARES															
NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER	TEXT #	NUMBER #	NUMBER	NUMBER	NUMBER	TEXT	NUMBER	NUMBER	NUMBER #	NUMBER #	TEXT #
S. No.	Item Description	Quantity	Units	HSN Code	Quoted Currency in INR / Other Currency	UNIT EX-WORKS PRICE In Figures To be entered by the Bidder	TOTAL EX-WORKS PRICE	FREIGHT RATE	FREIGHT AMOUNT	GST TYPE	GST RATE	GST AMOUNT	TOTAL AMOUNT Without Taxes TOTAL EX-WORKS + FREIGHT)	TOTAL AMOUNT With Taxes (TOTAL EX-WORKS + FREIGHT + GST)	TOTAL AMOUNT In Words
1	2	4	5	7	12	13	14	15	16	18	20	21	53	54	55
1	**MANDATORY SPARES FOR FLOAT CUM BOOST CHARGER (MAIN PLANT-550A)**														
1.1	SET OF ELECTRONIC CARDS / MODULES	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.2	SET OF AUXILIARY RELAYS	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.3	SET OF FUSE LINKS & GLASS FUSES	3	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.4	SET OF SCR & DIODE	3	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.5	RECTIFIER TRANSFORMER	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
1.6	CONTROL TRANSFORMER	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2	**MANDATORY SPARES FOR FLOAT CUM BOOST CHARGER (RWPH- 50A)**														
2.1	SET OF ELECTRONIC CARDS / MODULES	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.2	SET OF AUXILIARY RELAYS	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.3	SET OF FUSE LINKS & GLASS FUSES	3	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.4	SET OF SCR & DIODE	3	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.5	RECTIFIER TRANSFORMER	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
2.6	CONTROL TRANSFORMER	1	Set of each type & rating	8504	INR		0.0000		0.0000			0.0000	0.000	0.000	INR Zero Only
Total in Figures													0.000	0.000	INR Zero Only
Quoted Rate in Words		INR Zero Only													

Validate Print Help

Item Rate BoQ

Tender Inviting Authority: Bharat Heavy Electricals Limited-Project Engineering Management, Noida

Name of Work: BOQ cum PRICE SCHEDULE OF SUPERVISION OF ERECTION & COMMISSIONING FOR DC BATTERY CHARGER FOR 3X800 MW PVUNL PATRATU TPP PHASE-I

Tender Enquiry No.: PE/PG/PA1/E-6728/2021 dt. 11/08/2021

Name of the Bidder/ Bidding Firm / Company :	

NOTES:

1) SUPERVISION OF ERECTION & COMMISSIONING INCLUDES TESTS ON ALL BATTERY CHARGERS TO BE CARRIED OUT AT SITE ON COMPLETION OF E & C AND IMMEDIATELY PRIOR TO PUTTING IN SERVICE.

2) AMOUNT PAYABLE FOR ENGINEER PER VISIT TO SITE = VISIT CHARGES AS PER S. NO. 1 BELOW + (DAILY CHARGES AS PER SL. NO. 2 BELOW X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE).

3) THE VISIT CHAGRES SHALL BE INCLUSIVE OF CHARGES OF AIR FARE / TRAIN FARE, BOARDING / LODGING, LOCAL CONVEYANCE, MEDICAL, INSURANCE ETC.

4) SITE VISIT CHARGES SHALL BE APPLICABLE FOR ANY VISIT MADE BY VENDOR AT SITE AFTER RECEIVING THE INSTRUCTION FROM BHEL FOR DEPUTATION OF VENDOR REPRESENTATIVE. THE VISIT CAN BE CALLED FOR SUPERVISION OF COMMISSIONING & TESTING ETC.

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER	TEXT #	NUMBER #	NUMBER	TEXT	NUMBER	NUMBER	NUMBER #	NUMBER #	TEXT #
S. No.	Item Description	Quantity	Units	HSN Code	Quoted Currency in INR / Other Currency	UNIT EX-WORKS PRICE In Figures To be entered by the Bidder	TOTAL EX-WORKS PRICE	GST TYPE	GST RATE	GST AMOUNT	TOTAL AMOUNT Without Taxes TOTAL EX-WORKS + FREIGHT)	TOTAL AMOUNT With Taxes (TOTAL EX-WORKS + GST)	TOTAL AMOUNT In Words
1	2	4	5	7	12	13	14	18	20	21	53	54	55
1	LUMP SUM CHARGES PER VISIT FOR ENGINEER (EXCEPT DAILY CHARGES)	7	Visit	9987	INR		0.0000			0.0000	0.000	0.000	INR Zero Only
2	LUMP SUM DAILY CHARGES FOR ENGINEER	28	Days	9987	INR		0.0000			0.0000	0.000	0.000	INR Zero Only
Total in Figures											0.000	0.000	INR Zero Only
Quoted Rate in Words		INR Zero Only											

Validate Print Help

Item Rate BoQ

Tender Inviting Authority: Bharat Heavy Electricals Limited-Project Engineering Management, Noida

Name of Work: COST OF WITHDRAWAL FOR DC BATTERY CHARGER FOR 3X800 MW PVUNL PATRATU TPP PHASE-I

Tender Enquiry No.: PE/PG/PA1/E-6728/2021 dt. 11/08/2021

Name of the Bidder/ Bidding Firm / Company :	

ANNEXURE-II (COST OF WITHDRAWAL)

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NOTES:

1. Cost of Withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. All the bidders have to list out all their technical & commercial deviations (if any) in details in the above format.
3. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
4. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable. In absence of same, such deviation(s) shall not be considered and offer shall be considered in total compliance to NIT.
5. Bidder shall furnish price copy of above format along with price bid.
6. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
7. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
8. For deviations w.r.t. Credit Period, Liquidated damages, Firm prices if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VII of GCC, Rev-07 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
9. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
10. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
11. Cost of withdrawal is to be given seperately for each deviation. In no event bidder should club cost of withdrawl of more than one deviation else cost of withdrawl of such deviations which have been clubbed together shall be considered as NIL.
12. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
13. In case of descrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

NUMBER #	TEXT #	TEXT #	NUMBER #	NUMBER	TEXT	TEXT	TEXT	TEXT	NUMBER #	TEXT #
Sl. No.	Item Description	Quoted Currency in INR / Other Currency	Cost of withdrawal of deviation to be entered by the bidder in Rs.	Page no.	Technical specification/tender document clause no.	Reference of price schedule of which cost of withdrawal of deviation is applicable	Nature of cost of withdrawal of deviation (positive/Negative)	Reasons for quoting deviation	TOTAL AMOUNT Without Taxes in Rs.	Total FOR site Price In Words
1	2	12	13	23	24	30	31	36	53	55
1.01	**TECHNICAL DEVIATION**									
1.02	Technical deviation	**INR**							**0.000**	INR Zero Only
1.03	Technical deviation	**INR**							**0.000**	INR Zero Only
1.04	Technical deviation	**INR**							**0.000**	INR Zero Only
1.05	Technical deviation	**INR**							**0.000**	INR Zero Only
2	**COMMERCIAL DEVIATION**									
2.01	Commercial deviation	**INR**							**0.000**	INR Zero Only
2.02	Commercial deviation	**INR**							**0.000**	INR Zero Only
2.03	Commercial deviation	**INR**							**0.000**	INR Zero Only
2.04	Commercial deviation	**INR**							**0.000**	INR Zero Only
Total in Figures									**0.00**	Zero Only

Quoted Rate in Words	**INR Zero Only**

3 X 800 MW PATRATU SUPER THERMAL POWER STATION EXPENSION PHASE-1

VOLUME – II

TECHNICAL SPECIFICATION FOR

220V DC BATTERY CHARGER

BHEL DOCUMENT NO. : PE-TS-434-508-E002
REVISION NO. : 0

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-201301, UTTAR PRADESH, INDIA

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	TOTAL NO. OF SHEETS=	**65**
	(INCLUDING COVER/ SEPARATOR SHEETS)	

COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.

2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'.

3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.

4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.

5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in BOQ-Cum-Price schedule enclosed with NIT shall not be considered (i.e., technical description & quantities as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE

SECTION –I

SPECIFIC TECHNICAL REQUIREMENTS

1.0 SCOPE OF ENQUIRY

1.1 Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing, delivery to site and Supervision of E&C of **220V DC BATTERY CHARGER** conforming to this specification.

1.2 General technical requirements of the **220V DC BATTERY CHARGER** are indicated in Section-II. Project specific technical/ quality requirements / changes are listed in Section-I & Data Sheet - A.

1.3 The stipulations of Section-I, followed by those of Data Sheet-A shall prevail in case of any conflict between the stipulations of Section-I, Data Sheet - A & Section-II.

1.4 The documents shall be in English Language and MKS system of units.

2.0 BILL OF QUANTITIES:

2.1 Quantity requirements shall be as per 'BOQ-cum-price schedule' as part of NIT.

3.0 SPECIFIC TECHNICAL REQUIREMENTS

3.1 Technical /Quality/ Inspection:

S. No.	*Reference clause No. of Section II (if any)*	*Specific Requirement/ Change*
1	Section II clause 11.9	All routine & acceptance test to be performed as per QAP NO 0000-999-QOE-S-005.Charges for carrying out these Type, routine & acceptance tests are deemed to be included in the charger price.

4.0 TYPE TEST

4.1 Successful bidder shall submit the reports of all the type tests as listed in this specification and carried out within last 10 years from the date as 17.07.2017

All equipment to be supplied shall be of type tested design. During detail engineering, the contractor shall submit for Owner's approval the reports of all the type tests as listed in this specification and carried out within last 10 years from the date of bid opening (17.07.2017). These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.
However, if the contractor is not able to submit report of the type test(s) conducted within last 10 years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements,
the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client/owners representative and submit the reports for approval.
All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.

4.2 The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design change".
Minor changes if any shall be highlighted on the endorsement sheet.

4.3 Dynamic response test and Temperature rise test at full load shall be carried out on each charger before dispatch at manufacturer's works.

5.0 DRAWINGS REQUIRED ALONG WITH TECHNICAL OFFER

i. Unpriced Price Schedule as enclosed with NIT with "Quoted" word against items with bidder's signature and company stamp.
ii. A copy of the sheet "Compliance certificate" with bidder's signature and company stamp.
iii. "Deviation Schedule" with "NO DEVIATION" and bidder's signature and company stamp.

6.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED AFTER PLACEMENT OF ORDER

Schedule of drawing & documents to be submitted is part of **NIT**

CLAUSE NO.	TECHNICAL REQUIREMENTS

BATTERY CHARGER

1.00.00 CODES AND STANDARDS

1.01.00 All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of techno-commercial bid. In case of conflict between this specification and those (IS codes, standards etc.) referred to herein, the former shall prevail. All work shall be carried out as per the following standards and codes.

ANSI-C 37.90a	Guide for surge withstand capability tests
IS:5	Colours for ready mix paints.
IS : 694	PVC Insulated Cable for working voltages upto and including 1100 V.
IS : 1248	Specification for Direct acting indicating analogue electrical measuring instruments.
IS:13947 Part-1	Degree of protection provided by enclosures for low voltage switch gear and control gear.
IS : 13947	Specification for low voltage switch gear and control gear
IS : 3231	Electrical relays for power system protection.
IS : 3842	Application guide for Electrical relays for AC System
IS : 3895	Mono-crystalline semi-conductor Rectifier Cells and Stacks
IS : 4540	Mono crystalline semi-conductor Rectifier assemblies and equipment.
IS:6005	Code of practice for phosphating of Iron and Steel.
IS:6619	Safety Code for Semi-conductor Rectifier Equipment.
IS:6875	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages upto 1000 V AC or 1200 V DC.
IS : 9000	Basic environmental testing procedures for electronic and electrical items.
IS:13703	Low voltage fuses for voltages not exceeding 1000 V AC or 1500 V DC.

CLAUSE NO.	TECHNICAL REQUIREMENTS

EEUA-45D	Performance requirements for electrical Alarm Annunciation System
	Indian Electricity Rules
	Indian Electricity Act.

1.02.00 Equipment complying with other internationally accepted standards such as IEC, BS, VDE etc. will also be considered if they ensure performance and constructional features equivalent or superior to standards listed above. In such a case, the Bidder shall clearly indicate the standard(s) adopted, furnish a copy in English of the latest revision of the standards along with copies of all official amendments and revisions in force as on date of opening of techno-commercial bid and shall clearly bring out the salient features for comparison.

2.00.00 EQUIPMENT DESCRIPTION

2.01.00

CLAUSE NO.	TECHNICAL REQUIREMENTS

2.02.00 **PART-II BATTERY CHARGER FOR NICKEL-CADMIUM TYPE BATTERY**

(a.) The Battery Chargers as well as their automatic regulators shall be of static type. Battery chargers shall be capable of continuous operation at the respective rated load in Trickle mode i.e. Trickle charging the associated DC Nickel-Cadmium Batteries while supplying the D.C. loads. The Batteries shall be Trickle charged at 1.4 to 1.42 Volts per cell. All chargers shall be capable of Boost Charging the associated D.C. Battery at 1.53 to 1.7 Volts per cell at the desired rate. The Chargers shall be designed to operate, as mentioned above, at an ambient air temperature of 50°C.

(b.) All Battery Chargers shall have provision to receive two input supplies along with suitable automatic changeover between the sources.

(c.) Battery Chargers shall have a selector switch for selecting the battery charging mode i.e. whether Trickle or Boost charging.

(d.) All Battery Chargers shall be provided with facility for both automatic and manual control of output voltage and current. A selector switch shall be provided for selecting the mode of output voltage/current control, whether automatic or manual. Means shall be provided to avoid current/voltage surges of harmful magnitude/nature which may arise during changeover from Auto to Manual mode or vice-versa under normal operating condition.

(e.) Soft start features shall be provided to build up the voltage to the set value slowly within fifteen seconds. The chargers shall have load limiters which shall cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the Charger. The load limiter

CLAUSE NO.	TECHNICAL REQUIREMENTS

characteristic shall be such that any sustained overload or short circuit in DC system shall not damage the Charger, nor shall it cause blowing of any of the charger fuses. The Charger shall not trip on overload or external short circuit. After clearance of fault, the Charger voltage shall build up automatically when working in automatic mode.

(f.) When on automatic control mode during Trickle charging, the Charger output voltage shall remain within +/-1% of the set value for AC input voltage variation of +/-10%, frequency variation of +3 to -5%, a combined voltage and frequency (absolute sum) variation of 10% and a continuous DC load variation from zero to full load. Uniform and stepless adjustments of voltage setting (in both manual and automatic modes) shall be provided on the front of the Charger panel covering the entire Trickle charging output range specified & shall be capable of matching the float voltage correction recommendations(w.r.t. temperature) as suggested by the respective battery manufacturer. Stepless adjustment of the load limiter setting shall also be possible from 80% to 100% of the rated output current for Trickle charging mode.

(g.) During Boost charging, the Battery Chargers shall operate on constant current mode (When automatic regulator is in service). It shall be possible to adjust the Boost charging current continuously over a range of 50 to 100% of the rated output current for Boost charging mode. The charger output voltage shall automatically go on rising, when it is operating on boost mode, as the battery charges up. For limiting the output voltage of the charger, a potentiometer shall be provided on the front of the panel, whereby it shall be possible to set the upper limit of this voltage anywhere in the output range specified for boost charging mode. All voltage and current setting potentiometers shall be vernier type.

(h.) Energising the Charger with fully charged battery connected plus 10% load shall not result in output voltage greater than 110% of the voltage setting. Time taken to stabilise, to within the specified limits as mentioned elsewhere shall be less than fifteen seconds.

(i.) Momentary output voltage of the Charger, without the Battery connected shall be within 94% to 106% of the voltage setting during sudden load Change from 100% to 20% of full load or vice-versa. Output voltage shall return to, and remain, within the limits specified as mentioned elsewhere in less than 2 seconds after the above mentioned change.

(j.) The Charger manufacturer may offer an arrangement in which the voltage setting device for Trickle charging mode is also used as output voltage limit setting device for Boost charging mode, and the load limiter of the trickle charging mode is also used as Boost charging current setting device.

CLAUSE NO.	TECHNICAL REQUIREMENTS
	(k.) Suitable filter circuits shall be provided in all the Chargers to limit the ripple content (peak to peak) in the output voltage to 1% irrespective of the DC load, even when they are not connected to a battery. (l.) The DC System shall be ungrounded and float with respect to the ground potential when healthy. An earth fault relay shall be provided by the Employer in the DC distribution board for remote annunciation. (m.) Digital Outputs shall be configured for connection to the DC health monitoring system for real-time charger status updation. Outputs like charger output current, output voltage, float/boost mode, etc may be configured.
2.03.00	Printed Circuits Boards (PCB) PCB shall be made of glass epoxy of 1.6 mm thick, fire resistant, bonded with 99.8% pure copper foil, free of wrinkles, blisters, scratches and pinholes. The contact surface of the edge connectors of the PCBs shall be plated with hard gold to a minimum thickness of 5 microns. Component identification shall be printed on PCB by silk screen method. All PCBs shall be tropicalised and masked.
2.04.00	CONTACTORS All Battery Chargers shall have an AC contactor on the input side. It shall be of air break type and suitable for continuous duty. The operating coil shall be rated for 415 Volts AC.
2.05.00	Thermal Overload Relay A thermal overload relay incorporating a distinct single phasing protection (using differential movement of bimetal strips) shall also be provided for the AC input. The relay shall trip the above contactor.
2.06.00	Rectifier-Transformers and Chokes The rectifier transformer and chokes shall be dry and air cooled (AN) type. The rating of the rectifier-transformers and chokes shall correspond to the rating of the associated rectifier assembly. The rectifier-transformers and chokes shall have class-B insulation with temperature rise limited to class-A insulation value.
2.07.00	Rectifier Assembly The rectifier assembly shall be full wave bridge type and designed to meet the duty as required by the respective Charger. The rectifier cells shall be provided with their own heat dissipation arrangement with natural air cooling for up to 400A rating chargers. However, the rectifier cells shall be provided with their own heat dissipation arrangement along with forced air cooling for above 400A rating chargers and fan shall be temperature controlled with 100%

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standby redundancy. The rectifier shall utilise diodes/thyristors and heat sinks rated to carry 200% of the load current continuously and the temperature of the heat sink shall not be permitted to exceed 85°C absolute duly considering the maximum charger panel inside temperature. The Contractor shall submit calculations to show what maximum junction temperature will be and what the heat sink temperature will be when operating at 200% and 100% load current continuously duly considering the maximum surrounding air temperature for these devices inside the charger panel assuming air ambient temperature of 50°C outside the panel. Necessary surge protection devices and rectifier type fast acting fuses shall be provided in each arm of the rectifier connections.

2.08.00 DIGITAL INDICATING INSTRUMENTS

Digital indicating instruments with built in communication port for remote data transfer shall be provided for all chargers. The instruments shall indicate DC current, DC voltage & AC voltage and instrument shall be 96 x 96 mm^2, with display accuracy 0.5%, 4 digit-7 segment LED/LCD display and RS 485 Serial Bus port.

2.09.00 AIR BREAK SWITCHES

All Chargers shall have AC input and DC output switches of air break, single throw, load break and fault make type. The contacts of the switches shall open and close with a snap action. Switches shall be rated for 120% of the maximum continuous load. 'ON' & 'OFF' position of the switch shall be clearly indicated.

2.10.00 CONTROL AND SELECTOR SWITCHES

Control and selector switches shall be of rotary stayput type with escutcheon plates showing the functions and positions. The switches shall be of sturdy construction and suitable for mounting on panel front. Switches with shrouding of live parts and sealing of contacts against dust ingress shall be preferred. The contact ratings shall be atleast the following:

(a.) Make and carry continuously – 10 Amps.

(b.) Breaking current at 220 V DC – 0.5 Amp. (inductive)

(c.) Breaking current at 240 V AC – 5 Amp. At 0.3 p.f.

2.11.00 FUSES

Fuses shall be of HRC cartridge fuse link type. Fuses shall be mounted on fuse carriers which are mounted on fuse bases. Wherever it is not possible to mount fuses on fuse carriers, fuses shall be directly mounted on plug in type bases. In such cases one insulated fuse pulling handle shall be supplied for each charger. Kick-off fuses (trip fuses) with alarm contacts shall be provided for all D.C. fuses.

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2.12.00	Indicating Lamps Three (3) indicating lamps shall be provided to indicate A.C. supply availability. The indicating lamp shall be of panel mounting, filament type low wattage or LEDs and capable of clear status indication under the normal room illumination. The lamps shall be provided with series resistors (non-hygroscopic) preferably built in the lamp assembly and replaceable from front. The lamp covers shall be preferably screwed type, unbreakable and moulded from heat resistant material
2.13.00	Blocking Diode Blocking diode shall be provided in the output circuit of each Charger to prevent current flow from the D.C. Battery into the Charger.
2.14.00	Annunciation System Visual indications through indicating lamps/LEDs or annunciation fascia as per EEUA-45D shall be provided in all Chargers for the following: (a.) A.C. supply failure (b.) Rectifier fuse failure (c.) Surge circuit fuse failure (d.) Filter fuse failure (e.) Load limiter operated (f.) Charger trip (g.) Battery on Boost Potential free NO contacts of all above conditions shall be provided for following remote alarms in the Employer's Unit Control Board: (a) Battery on Boost (b) Charger trouble (this being a group alarm initiated by any of the faults other than 'Battery on Boost')
2.15.00	Name Plates and Marking The name plates shall be made of non-rusting metal/3 ply Lamicoid and shall have black back-ground with white engraved letters and secured by screws. These shall be provided near top edge on the front as well as on rear side of Charger. Name plates with full and clear

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inscriptions shall also be provided on and inside the panels for identification of the various equipments.

3.00.00 CONSTRUCTION

3.01.00 The Chargers shall be indoor, floor mounted, self supporting sheet metal enclosed cubicle type. The Contractor shall supply all necessary base frames, anchor bolts and hardware. The Charger shall be fabricated using cold rolled sheet steel shall not less than 1.6 mm and shall have folded type of construction. The panel frame shall be fabricated using cold rolled sheet steel of thickness not less than 2.0 mm. Removable undrilled gland plates of at least 3.0 mm sheet steel and lugs for all cables shall be supplied by the Contractor. The lugs for cables shall be made of electrolytic copper with tin coat. Cable sizes shall be advised to the Contractor at a later date for provision of suitable lugs and gland plates. The Charger shall be tropicalised and vermin proof. Ventilation louvers shall be backed with fine brass wire mesh. All doors and covers shall be fitted with synthetic rubber gaskets. The Chargers shall have hinged double leaf doors provided on front and/or backside for adequate access to the Charger internals. All the Charger cubicle doors shall be properly earthed. The degree of protection of Charger enclosure shall be atleast IP-42.

3.02.00 All indicating instruments, control & selector switches and indicating lamps shall be mounted on the front side of the Charger. Design of panels shall be based on the following dimensions.

1)	Overall height	-	Maximum 2350 mm
2)	Operating handles (highest and lowest positions reached by operator's hands), protective mechanical indicators	-	Maximum 1800 mm Minimum 350 mm
3)	Doors and panel handles and locks	-	Maximum 1800 mm Minimum 300 mm

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3.03.00	The layout of Charger components shall be such that their heat losses do not give rise to excessive temperature within the Charger panel surface. Location of the electronic modules will be such that temperature rise of the location, in no case, will exceed 10°C over ambient air temperature outside the Charger.
3.04.00	Each Charger panel shall be provided with an illuminating lamp and one 5 Amp. Socket. Switches and fuses shall be provided separately for each of the above.
3.05.00	Locking facilities shall be provided as following: 1. For locking Trickle/Boost selector switch in the trickle position only. This would be used for having key mechanical interlock between Trickle/Boost selector switch and isolator in D.C. distribution board which is being procured separately by the employer. The co-ordination & execution of this interlock shall be carried out by the contractor. 2. The Charger enclosure door locking requirements shall be met by the application of padlocks. Padlocking arrangement shall allow ready insertion of the padlock shackle but shall not permit excessive movement of the locked parts with the padlock in position.
3.06.00	**Wiring**
3.06.01	Each Charger shall be furnished completely wired upto power cable lugs and terminal blocks ready for external connection. The power wiring shall be carried out with 1.1 KV grade PVC insulated cables conforming to IS:1554 (Part-I). The control wiring shall be of 1.1KV grade PVC insulated stranded copper conductors of 2.5 sq.mm. conforming to IS:694. Control wiring terminating at electronic cards shall not be less than 1.0 sq. mm. Control terminal shall be suitable for connecting two wires with 2.5 sq.mm. stranded copper conductors. All terminals shall be numbered for ease of connections and identification. At least 20% spare terminals shall be provided for circuits.
3.06.02	Power and control wiring within panels shall be kept separate. Any terminal or metal work which remains alive at greater than 415 V, when panel door is opened, shall be fully protected by shrouding.
3.06.03	An air clearance of at least ten (10) mm shall be maintained throughout all circuits, except low voltage electronic circuits, right upto the terminal lugs. Whenever this clearance is not available, the live parts should be insulated or shrouded.

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3.07.00	**PAINTING** Treatment as per IS:6005. Two coats of lead oxide primer followed by powder painting with final shade of RAL9002 for complete panel except end covers & RAL 5012 for end covers.
4.00.00	**TESTS**
4.01.00	All equipment to be supplied shall be of type tested design. During detail engineering, the contractor shall submit for Owner's approval the reports of all the type tests as listed in this specification and carried out within last ten years from the date of techno-commercial bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.
4.02.00	However if the contractor is not able to submit report of the type test(s) conducted within last ten years from the date of techno-commercial bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client/owners representative and submit the reports for approval.
4.03.00	All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.
4.04.00	The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and “No design change”. Minor changes if any shall be highlighted on the endorsement sheet.
4.05.00	GENERAL 1. The contractor shall furnish the following type tests reports for each rating of the equipment to be supplied under this contract. a) Complete physical examination b) Temperature rise test at full load. (For chargers of up to 400A rating, Temperature rise test report for rectifier assembly at 200% of full load shall also be submitted.) c) Insulation resistance test. d) High voltage (power frequency) test on power and control circuits except low voltage electronic circuits.

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e) Ripple content test at

i) No load

ii) Half load

iii) Full load

f) Automatic voltage regulator operation test at specified A.C. supply variations at

i) No load

ii) Half load

iii) Full load

g) Load limiter operation test

h) Efficiency and power factor measurement.

i) Input and output surge withstand capability test. Surge Voltage as per ANSI-C37.90a shall be applied for period not less than 2 sec. At the following points of the Charger operating at full load :

i) Across each A.C. input phase

ii) Across AC input line to ground.

iii) Across D.C. output terminals.

iv) Across each D.C. output terminal to ground

The Charger shall not exhibit any component damage and there shall be no change in performance as per (g) and (h).

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j) Environmental Tests

Steady state performance tests (f) and (g) shall be carried out before and after each of the following tests.

i) Soak Test

The electronic modules shall be subjected to continuous operation for a minimum period of 72 hours. During last 48 hours, the ambient temperature shall be maintained at 50 deg. C. The 48 hour test period shall be divided into four equal 12 hour segments. The input voltage during each 12 hours shall be nominal voltage for 11 hours followed by 110% of nominal voltage for 30 minutes, followed by 90% of nominal voltage for 30 minutes.

ii) Degree of protection test.

2. Dynamic response test and Temperature rise test at full load shall be carried out on each charger before dispatch at manufacturer's works.

5.00.00 COMMISSIONING

5.01.00 The contractor shall carryout the following commissioning tests and checks after installation of the equipment at site:

a) Complete physical examination.

b) Checking of proper operation of annunciation system.

c) Insulation resistance test.

d) Automatic voltage regulator operation.

e) Load limiter operation.

f) Updation of charger status in DC Battery Health monitoring system.

SECTION-I
ANNEXURE-B

PACKING SPECIFICATION FOR BATTERY CHARGER

CHARGER shall be despatched in "Crate Packing" using wood.

1.0 PREPARATION OF PACKING CASES:

1.1 **DIMENSIONS:**

1.1.1 Minimum number of planks shall be used for a shook.
1.1.2 Thickness of planks for Front, rear, top and bottom sides and binding, jointing battens shall be 25/20mm +2/-3 mm
1.1.3 Horizontal, vertical, diagonal planks shall be given for binding
1.1.4 Width of binding planks shall be minimum 100mm
1.1.5 Distance between any 2 binding planks shall be less than 750mm
1.1.6 Diagonal planks shall be used in between vertical binding planks when distance between inner to inner of vertical planks is more than 750mm
1.1.7 Distance of the outer edges of these planks from the edge of case shall be less than 250mm.
1.1.8 Diagonal planks are not required for top planks and width side, if the width of pallet is less than 750mm.

1.2 JOINTING OF PLANKS**:**

Single length planks shall be used for cubicles whose overall length is less than 2400 mm. For cubicles of length more than 2400 mm, jointing is permitted. The jointing shall be done with one single or maximum of 2 planks of wood same as other planks of width 250 mm (minimum) with two rows of nails on either side of the joint in zigzag manner. From the joint along height side, it shall be of lap joint with overlap of at least the width of plank.

1.3 PERMISSIBLE DEFECTS

Wood shall be free from knots, bows, visible sign of infection and any kind of decay caused by insects, fungus, etc.

End splits: Longest end splits at each end shall be measured and lengths added together. The added length shall not exceed 60mm per meter run of shook's. Wood pins shall be used to prevent further development of split.

Surface cracks: Surface cracks with a maximum depth of 3mm are permissible. A continuous crack of any depth all along the length is not allowed.

1.4 OTHER MATERIALS

1.5.1 NAILS

Nils of suitable dia and length shall be used for joining the planks.

1.5.2 BLUE NAILS

If applicable, these shall be used for nailing bituminized Kraft paper/hessian cloth to the planks.

1.5.3 HOOP IRON STRIPS

These are used for strapping the boxes. The material shall be free from rust. If sufficient nailing is done for bigger boxes, strapping need not be done.

PACKING SPECIFICATION FOR BATTERY CHARGER

1.5.4 CLIPS

These shall be used for strapping the hoop iron strips on the boxes.

1.5.5 BRACKETS

Brackets of suitable dimension shall be used for nailing to the corners of cubicle boxes. The brackets shall be of mild steel of suitable thickness. The brackets shall be of “L" shape. Two holes shall be provided towards the end of each side for screwing /nailing.

1.5.6 MULTI LAYERED CROSS LAMINATED POLYTHELENE FILM

100GSM(colourless) Multi Layered Cross Laminated Polyethylene Film shall be used to make covers to the jobs individually. The cross lamination gives qualities of extra toughness, together with flexibility and lightness coupled with good weather resistance to ultra violet rays.

1.5.6 RUBBERISED COIR:

The rubberized coir is used as cushioning material. For the packing of loose items, items are to be arrested by using rubberized coir.

1.5.7 FASTENERS

Bolts, double nuts, spring washers will have to be used to hold the job to the bottom plank of the box so that there shall be no jerk on the CHARGER during transit.

1.5.8 PACKING SLIP:

Packing slip kept in the polyethylene bag shall be placed in the box at appropriate place. In addition, one more packing slip covered in polyethylene cover and packing slip holder shall be nailed to front / rear of case.

1.5.9 MARKING PLATE:

Marking on the packing case shall be done as per the manufacturer standard.

DATASHEET-A

Sr. No.	PARAMETER	UNIT	VALUE
1.0	**Power Supply & fault level details**		
1.1	Rated AC voltage & variation	V, %	415 V, 3Ph, 3 Wire Systems, (-) 10% to (+) 10%
1.2	Frequency & variation	Hz, %	50 Hz, +3% to -5%
1.3	Rated DC voltage & variation	V, %	220 V, 187 V to 242V
1.4	Fault current of 415V system	kA	50 kA for 1 sec.
1.5	Fault current of DC system limited up to (max)	kA	The Charger shall be designed to restrict maximum fault level on DCDB limited to 25kA for 1 Sec.
1.6	Type/ Capacity of battery (min.)	AH	(i) 1530 AH Ni-Cd battery (ii) 90 AH Ni-Cd battery * Refer Note 3 below
2.0	**Charger current rating**		
2.1	Float-cum-boost charger	A	(i) 550A (ii) 50A
3.0	**Type of cooling**		Clause no 2.07, Page no 06 of 13, Annexure-A Section-I
4.0	**Ripple content of charger**		
4.1	RMS	%	
4.2	Peak to peak	%	± 1%
5.0	**Degree of Protection (DOP)**		
5.1	Rectifier transformer cubicle		IP-42
5.2	Control cubicle		IP-42
6.0	**Constructional features**		
6.1	Panel sheet thickness/ material	mm	1.6mm Cold rolled sheet steel for panel fabrication with folded type construction and 2.0mm Cold rolled sheet steel for panel frame.
6.2	Paint shade		Treatment as per IS 6005.Two coats of lead oxide primer followed by powder painting with final shade of RAL 9002 for complete panel except end covers & RAL 5012 for end

			covers.
6.3	Cable gland plate thickness/ material	mm	3 mm / Sheet steel
6.4	Gasket thickness/ material	mm	3 mm / Rubber
6.5	**CABLE SIZES** a) Cable size from Battery TB to Fuse Box b) Cable size from Fuse Box to DCDB c) Cable size from Charger to DCDB d) Cable Size for FCB Charger AC Incomer		Actual cable size and number of runs shall be informed during detailed engineering.
7.0	**Type Tests**		
7.1	Type tests to be conducted for this contract, despite availability of valid & acceptable test certificates	Yes/ No	YES, As per Section –I/ Quality plan. Dynamic response test and Temperature rise test at full load shall be carried out on each charger before dispatch at manufacturer's works.
8.0	**EARTHING**		
8.1	Grounding terminal size/ no. for each charger		65X8 MM./ 2 nos.
8.2	Grounding terminal size/ no. for each fuse box		65X8 MM./ 2 nos.
8.3	Grounding terminal size/ no. for each discharge resistor		65X8 MM./ 2 nos.
9.0	**Mandatory Spares**		
9.1	Mandatory Spares to be quoted for this contract	Yes/ No	YES
9.2	If yes, list of mandatory spares		As per BOQ cum unpriced schedule enclosed with NIT
10.0	**E & C Spares**		
10.1	E & C Spares to be quoted for this contract	Yes/ No	Yes
10.2	If yes, list of E & C Spares		As per NIT (BOQ cum Price Schedule)
11.0	**Special tools & tackles**		
11.1	Special tools & tackles to be quoted for this contract	Yes/ No	Yes (If applicable)
11.2	If yes, list of Special tools & tackles		Bidder to furnish the list.
12.0	**Battery Fuse Box**	Fuses for both Positive and Negative Pole shall be provided. Also Construction shall be same as Charger Panel. Battery Fuse	

		Box shall be wall-mounted type. Minimum rating of Battery Fuse Box shall be as indicated in the BOQ cum price schedule. * Refer note -3
13.0	**Discharge Resistor Panel**	a) Portable type 1530AH & 90AH NI-CD battery discharge resistor panels shall be supplied with shunt suitable for 5 hrs discharge rate. b) Cooling of discharge resistor shall be natural/ forced air cooled. DOP for load bank, shall be at least IP 20. c) Construction shall be same as Charger panel. Handle and wheel arrangement shall be provided for easy movement. d) Control - Using rotary switches for step control of current against falling voltage with ON-OFF facility. * Refer note -3

Notes:

1) BHEL will provide 3 PH-3 wire power Supply. Further distribution for single Phase shall be created by Bidder.

2) All tests as per QP No. : 0000-999-QOE-S-005 to be carried out.

3) Actual rating of Battery fuse box and discharge resistor panel shall be selected by the bidder based on load duty cycle (Annexure-III).

Sr. No.	PARAMETER	UNIT	VALUE
1.0	Manufacturer's Name		
2.0	Design ambient temperature		
3.0	Charger Rating & Type		
4.0	Charger rated output current:		
4.1	Trickle charging mode		
4.2	Boost charging mode		
5.0	Load limiter current setting range (Trickle mode)		
6.0	Automatic voltage regulator (Trickle mode)		
6.1	Type		
6.2	% Stabilization of the output DC voltage		
6.3	Voltage setting range		
6.4	Walk in time of Automatic Voltage Regulator		
6.5	Time taken to stabilize voltage for under shoot & overshoot		
7.0	Manual voltage regulator (Trickle mode)		
7.1	Type		
7.2	Voltage setting range		
8.0	Boost charging		
8.1	Current setting range		
8.2	Voltage limit setting range		
9.0	Rectifier assembly		
9.1	Type of semi-conductor material		
9.2	Rated direct current per cell (Average)		
9.3	SCR Rating Selected		
9.4	Heat sink for SCR		
9.5	Rated direct voltage		
9.6	Rated input voltage		
9.7	Type of connections of rectifier element		
9.8	Standard applicable		
9.9	Ripple content		

Sr. No.	PARAMETER	UNIT	VALUE
10.0	Rectifier transformer		
10.1	Type		
10.2	Rated KVA & % impedance		
10.3	Input line winding connection in vector representation		
10.4	Cell winding connection in vector representation		
10.5	1 min. power frequency withstand voltage (kV)		
10.6	Standard applicable		
11.0	Charger full load Efficiency at nominal input & output voltage & current		
12.0	Power factor at nominal input & output voltage & current		
13.0	Instrument		
13.1	Manufacturer		
13.2	Type		
13.3	AC voltmeter range		
13.4	DC voltmeter range		
13.5	DC Ammeter range		
13.6	Dial size		
13.7	Accuracy class as per IS		
14.0	Contactor		
14.1	Manufacturer		
14.2	Type		
14.3	Rated voltage		
14.4	Rated current		
14.5	No. of power contact		
14.6	No. type and rating of Aux. Contacts		
14.7	Operating coil voltage		
14.8	Drop-out voltage		
15.0	Thermal over load relay		
15.1	Manufacturer		

Sr. No.	PARAMETER	UNIT	VALUE
15.2	Tripping current range		
15.3	Whether single phasing protection provided		
15.4	Standard applicable		
16.0	Air - break switches (both DC & AC side)		
16.1	Manufacturer		
16.2	Type		
16.3	Rated voltage		
16.4	Rated current		
16.5	Type & material of contacts		
16.6	Standard applicable		
17.0	Output fuse		
17.1	Manufacturer		
17.2	Type		
17.3	Rupturing capacity (both AC & DC)		
17.4	Standard applicable		
18.0	Painting		
18.1	Paint shade		
18.2	Painting process		
19.0	Degree of Protection (DOP)		
19.1	Rectifier transformer cubicle		
19.2	Control cubicle		
20.0	Earthing busbar size & material		
21.0	Charger dimension: (approx.) [L x W x H]		
22.0	Sheet thickness (mm) / material		
23.0	Cable gland plate thickness		
24.0	Gasket material		
25.0	Charger weight (Kg.)		

SECTION-II

STANDARD TECHNICAL REQUIREMENTS

1.0 INTENT OF SPECIFICATION

The intent of specification is not to specify all details of design & construction of material. The material shall, however, conform in all aspects to high standard of design, engineering and workmanship and be capable of performing in continuous operation up to & after bidder's guarantee period in manner acceptable to purchaser who will interpret the drawings & specification and shall have power to reject any work or material which in his judgement is not in full accordance with this specification.

This specification covers the design, manufacture, assembly, testing, packing and despatch of Battery charger (Float/Boost) complete in all respects with all components, fittings and accessories for efficient and trouble-free operation. The charger shall be connected with Lead acid/Ni-Cd type battery. In this specification though erection & commissioning is not included in vendor's scope, the vendor shall still not absolved of his responsibility of establishing the correctness of equipment at site.

2.0 CODES & STANDARDS

2.1 The material shall comply with all currently applicable safety codes and statutory regulations of India as well as of the locality where the material is to be installed.

2.2 The design, material, construction, manufacture, inspection, testing and performance of 220V DC Battery Charger shall conform to the latest revision of relevant standards and codes of practices as per Annexure-I.

2.3 In case of conflict between the applicable reference standard and this specification, this specification shall govern.

3.0 SERVICES AND EQUIPMENT TO BE EXCLUDED

A) Civil works like foundation and cable cellar, flooring of the battery charger room etc.
B) Ventilation of battery and charger room.
C) DCDB
D) Power and control cables except internal wiring of the charger
E) Erection of the equipment
F) Battery

4.0 OPERATIONAL REQUIREMENTS

4.1 Under normal conditions, when the AC supply is healthy at the battery charger input terminals, the float charger shall feed the continuous DC loads, while the boost charger shall remain off. Over and above the continuous DC loads the float charger shall also supply the necessary charge to the battery, to keep the later in fully ready condition for being available during AC supply failure at charger terminals. Also some of the impulse loads of duration

less than a minute for which the response of the charger is poor, shall be by the associated battery in the DC system. This impulse discharge, shall, however, be continuously replenished by the float charger, unless the discharge is of considerable magnitude, in the event of which the boost charger shall be deployed.

4.2 The float charger shall withstand momentary supply failure due to changeover on AC supply feeding bus and continue to operate on float mode satisfactorily on restoration of AC supply to charger.

4.3 The DC system shall be ungrounded and shall float with respect to be ground potential when healthy.

4.4 After the batteries are boost charged and operation is changed to float mode, the voltage impressed on the loads shall not exceed float charge voltage.

4.5 The charger shall be designed to operate at an ambient air temperature of 50°C. It will be located indoor but in a hot, humid and tropical atmosphere.

4.6 The voltage at load terminal will not exceed the limits of +10% and -15% of nominal system voltage for DC system.

5.0 BATTERY CHARGERS

5.1 The battery chargers shall be self-regulating, natural air cooled, static type, composed of silicon controlled rectifiers (SCRs) connected in three phase full wave full control bridge circuit.

5.2 Each charger circuit shall be provided with its own AC input voltmeter with voltmeter selector switch, DC voltmeter & ammeter, battery DC output ammeter & voltmeter, battery charging current ammeter, control switches, rectifiers, Auto/ Manual voltage regulators, load limiting device, etc. as required for the successful operation of the DC system.

5.3 The charger shall have auto voltage regulators to enable stepless, smooth and continuous voltage control. The chargers shall have the effective current limiting feature and smoothing filters on both input and output to minimise harmonics, radio frequency transients, electromagnetic transients, etc.

5.4 The battery chargers as well as their automatic regulators shall be of static type. The battery chargers shall be capable of continuous operation at the respective rated load in float charging mode i.e. trickle charging the associated DC batteries while supplying the DC loads.

5.5 The battery chargers shall have a selector switch for selecting the battery-charging mode i.e. float or boost charging.

5.6 The battery chargers shall be provided with facility for both automatic and manual control of output voltage and current. The selector switch will select the mode of output voltage/current control, whether automatic or manual. Necessary provisions shall be

provided to avoid current/voltage surges of harmful magnitude/nature, which may arise during changeover from auto to manual mode or vice versa under normal operating condition.

5.7 Soft start feature shall be provided to build up the voltage to the set value slowly within 15 seconds. The chargers shall have load limiters, which shall cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the charger. The load limiter characteristic shall be such that any sustained overload or short circuit in DC system shall not damage the charger nor shall it cause blowing of any of the charger fuses. The charger shall not trip on overload or external short circuit. After clearance of fault, the charger voltage shall build-up automatically when working in automatic mode.

5.8 When on automatic control mode during float charging, the charger output voltage shall remain within ±1% of the set value for AC input voltage variation of ±10%, frequency variation of +3% to –5%, a combined voltage & frequency (absolute sum) variation of 10% and a continuous DC load variation from zero to full load. Uniform and stepless adjustment of voltage setting (in both auto/manual modes) shall be provided on the front of the charger panel covering the entire float charging output range specified. Stepless adjustment of the load limiter setting shall also be provided from 80% to 100% of the rated output current for float charging mode.

5.9 During boost charging, the battery chargers shall operate on constant current mode (when automatic regulator is in service). The boost charging current can be adjusted continuously over a range of 50% to 100% of the rated output current for boost charging mode. The charger output voltage shall automatically go on rising, when operating in boost mode, as the battery charges up. For limiting the output voltage of charger, a potentiometer shall be provided on the front of the panel, whereby it shall be possible to set the upper limit of this voltage anywhere in the output range specified for boost charging mode. All voltage and current setting potentiometers shall be vernier type.

5.10 Energising the charger with fully charged battery connected plus 10% load shall not result in output voltage greater than 110% of voltage setting. The time taken to stabilise within specified limits shall be less than 15 seconds.

5.11 In case of float-cum-boost charger, manufacturer shall offer an arrangement in which the voltage setting device for float charging mode is also used as output voltage limit setting device for boost charging mode, and the load limiter of the float charging mode is also used as boost charging current setting device.

5.12 Suitable filter circuits shall be provided in all the chargers to limit the ripple content (peak to peak) in the output voltage to 1%, irrespective of the DC load fluctuation even when they are not connected to a battery.

5.13 Momentary output voltage of the Charger, without the Battery connected shall be within 94% to 106% of the voltage setting during sudden load Change from 100% to 20% of full

load or vice-versa. Output voltage shall return to, and remain, within the limits (+/- 1% of the set value) in less than 2 seconds after the above mentioned change.

6.0 DESCRIPTION OF EQUIPMENT

6.1 Rectifier assembly

Rectifier assembly shall be full wave bridge type and designed to meet the duty as required by the respective charger. The rectifier cells shall be provided with their own heat dissipation arrangement with natural air-cooling. The rectifier shall utilise diodes / thyristors and heat sinks to carry 200% of the load current continuously and the temperature of the heat sink shall not be permitted to exceed 85°C absolute, duly considering the maximum charger panel inside temperature. The successful bidder shall furnish calculations to show what maximum junction temperature will be and what the heat sink temperature will be when operating at 200% and 100% load current continuously duly considering the maximum surrounding air temperature for these devices inside the charger panel at air ambient temperature of 50°C outside the panel. Necessary surge protection devices and rectifier type fast acting HRC fuses shall be provided in each arm of the rectifier connections. Heat run test for other charger components shall be carried out at 100% of rated current.

6.2 Rectifier transformer and Chokes

The rectifier transformer & chokes shall be dry and air cooled (AN) type. The rating of the rectifier transformers & chokes shall correspond to the rating of the associated rectifier assembly. The rectifier transformers & chokes shall have class-F insulation with temperature rise limited to class-B insulation value.

6.3 Blocking Diode

Blocking Diode shall be provided in the output circuit of each charger to prevent current flow from the DC battery into the charger.

6.4 Voltage regulators

6.4.1 The float charger shall have both auto and manual voltage regulation arrangements. The voltage regulator shall have auto/manual option and be of static type. A selector switch for selection of the mode of voltage regulation shall be provided. AVR time constant shall not exceed 0.5.

6.4.2 The boost charger shall have auto/manual voltage regulation arrangement. The voltage adjustment shall be uniform and step less throughout the voltage variation range. The regulator shall be of static type. The boost charger shall be designed to charge the fully discharged battery to fully charged condition.

6.5 Printed Circuit Boards (PCB)

PCB shall be made of glass epoxy of 1.6 mm thick, fire resistant, bonded with 99.8% pure copper foil, free of wrinkles, blisters, scratches and pinholes. The contact surface of the edge connectors of PCBs shall be plated with hard gold to a minimum thickness of 5 microns.

The component identification shall be printed on PCB by Silk screen method. All PCBs shall be tropicalized and masked.

6.6 Control and Selector Switches

The control and selector switches shall be of rotary stay put type with escutcheon plates showing functions and positions. The switches shall be of sturdy construction and suitable for mounting on panel front. The switches shall have shrouded live parts and sealed contacts against dust ingress. Auto/normal switch shall be of lockable type in either position. The contact ratings shall be at least the following:

- Make and carry continuously 10A
- Breaking current at 220V DC 0.5A (inductive)
- Breaking current at 240V AC 5.0A at 0.3 p.f.

6.7 Indicating Lamps

To indicate AC supply availability, three indicating lamps shall be provided. The indicating lamp shall be suitable for panel mounting, cluster type LED and capable of clear status indication under normal room illumination. The lamp covers shall be preferably screw type, unbreakable and moulded from heat resistant material.

6.8 Instruments

For all chargers, DC ammeter, DC voltmeter and AC voltmeter shall be provided in 96 mm2 size with 1.5 accuracy class conforming to IS-1248. The instruments shall be flush mounted type, dust proof, moisture resistant and have easy accessible means for zero adjustment. Digital indicating instruments with built in communication port for remote data transfer shall be provided for all chargers, with display accuracy 0.5%, 4 digit-7 segment LED/LCD display and RS 485 Serial Bus port.

6.9 Relays

The relays shall be enclosed in flush or semi flush dust tight cases finished with dull black enamel paint. Relays shall have self-contained test facilities and provisions for removing relay mechanism for inspection and maintenance.

6.10 Transducers

Transducers shall be panel-mounting type and suitable for operating temperatures from 0 to 55°C. Transducer output shall be used for remote display at DDCMIS/ ECP. Transducers shall be provided in charger panel for DC battery voltage, charger output voltage and charger output current. External power operated type transducer is also acceptable. The transducer shall have the following features:

- Input/ output with galvanic isolation
- Auxiliary voltage – 220V DC
- 4-20 mA independent dual output
- Accuracy class 0.5 or better
- Short circuit and over current protection

6.11 Contactors

All battery chargers shall have an AC contactor on the input side. It shall be of air break type and suitable for continuous duty. The operating coil shall be rated for 415 V. The DC contactors shall be single/double pole air break type and suitable for continuous duty.

6.12 Thermal overload relay

A thermal overload relay with single phasing protection (using differential movement of bimetal strips) shall also be provided for the AC input, which will trip the contactor.

6.13 Air break switches

All chargers shall have AC input and DC output switches of air break, single throw, load break and fault make type. The contacts of the switches shall open and close with a snap action. The switches shall be rated for 120% of the maximum continuous load. The 'ON' and 'OFF' position of the switch shall be clearly indicated. The operating handle of the switches shall be fully insulated from circuit and shall be effectively earthed.

6.14 Fuses

Fuses shall be of HRC cartridge fuse link type. Fuses shall be mounted on fuse carriers, which are mounted on fuse base. Wherever, it is not possible to mount fuses on fuse carriers, fuses shall be directly mounted on plug-in type bases. In such cases one insulated fuse pulling handle shall be supplied for each charger. Kick-off fuses (trip fuses) with alarm contacts shall be provided for all DC fuses. The fuses shall be suitable for applicable fault level.

6.15 Variable Metallic Resistors

One set of variable metallic resistors and shunt suitable for carrying out discharge tests (5 hour discharge rate for Ni-Cd battery on the batteries shall be supplied.

6.16 Battery fuse box

Battery fuse of adequate rating meeting the load duty cycle shall be supplied. Battery fuse box shall have suitable termination arrangement for terminating the cables informed during detailed engineering stage.

6.17 Panel Construction

The charger panels housing all the equipment shall be indoor, floor mounting, air natural cooled, self-supporting sheet metal enclosed cubicle type. The charger panel and its frame shall be fabricated from 1.6 mm & 2.0 mm cold rolled sheet steel respectively, and have folded type construction. The bidder shall also supply necessary base frames, anchor bolts and hardware. Removable undrilled gland plates of at least 3.0 mm thick sheet steel and lugs for all cables shall be provided. The lugs for cables shall be made of electrolytic tinned copper. The gland plate shall be of adequate size for accommodating requisite number of cable glands for power and control cables. The charger shall be tropicalized and vermin proof. Ventilation louvers shall be backed with fine brass wire mesh. All door and covers shall be fitted with synthetic rubber gaskets. The panels shall have hinged double leaf doors provided on front and backside for adequate access of charger terminals. All the charger cubicle doors shall be properly earthed. The panels shall comply with at least degree of protection IP-42. Incoming and outgoing cables shall enter from bottom. Suitable cable terminal board with electrolytic tinned copper cable lugs and double compression brass nickel-plated cable glands shall be provided in each panel for incoming and outgoing cables.

6.18 Electronic equipment shall be of modular design consisting of plug-in modules in standard 19 inches metallic racks with metallic card guides. The card should be provided with proper handles. Card to card wiring shall be through mother board. Unplanned jumpering and track modifications shall not be allowed. Mechanical interlocks to prevent wrong insertion of cards shall be provided. Each card shall have its junction and test points identified. Maintenance aids such as extension printed wiring boards and jumper leads shall be provided. Non modular design is also acceptable.

6.19 The layout of charger components shall be such that their heat losses do not give rise to excessive temperature within the charger panel surface. Location of the electronic modules will be such that temperature rise of the location, in no case, shall exceed 10°C over ambient air temperature outside the charger.

6.20 All the charger panels shall be provided with an illuminating lamp, a 5 Amp socket and space heaters with thermostat. Toggle switches and fuses shall be provided separately for each of the above fittings. Space heaters "ON" indication shall be provided. Two separate grounding pads shall be provided for each panel.

6.21 Locking facility

Locking facility shall be provided as follows:
For locking float/boost selector switch in the float position only. This shall be used for having key mechanical interlock between float/boost selector switch and isolator in DCDB.

The charger enclosure door-locking requirement shall be met by the application of padlocks. Padlocking arrangement shall allow ready insertion of the padlock shackle but shall not permit excessive movement of the locked parts with the padlock in position.

6.22 Control wiring

Each panel shall be furnished completely factory wired upto power cable lugs and terminal blocks ready for external connections. The power wiring shall be carried out with 1.1kV grade, PVC insulated cables conforming to IS-1554 (Part-1). The control wiring shall be of 1.1kV grade, 1 core stranded copper wire with colour coded PVC insulation having identification ferrules at both terminal and device end for each wire. Wires shall conform to IS-694 and minimum size of the wire shall not be less than 2.5 mm2. The control wiring terminating at electronic card shall not be less than 1.0 mm2. The control terminal shall be suitable for connecting two wires with 2.5 mm2 stranded copper conductors. All terminals shall be numbered for ease of connections and identification.

Power & control wiring within the panel shall be kept separate. Any terminal or metal work, which remains alive at greater than 415V, when panel door is opened, shall be fully protected by shrouding.

An air clearance of at least 10mm shall be maintained throughout all circuits, except low voltage electronic circuits, right up to the terminal lugs. Whenever this clearance is not available, the live parts shall be insulated or shrouded.

6.23 Terminal Blocks

Terminal blocks for all the chargers shall meet the following requirements:

a) Terminal block shall be 1.1kV grade, minimum 10A rated, one piece moulded complete with insulating barrier, clip on type terminals, washers, nuts and identification strip etc. It shall be similar to Klippon type RSF with insulating material of melamine or equivalent. Marking on terminal strips shall correspond to the terminal numbering on wiring diagrams. Terminal blocks for CT & VT secondary leads shall be provided with links to facilitate testing, isolation, star/delta and earthing. Terminal blocks for CT secondary shall have the short-circuiting facility.

b) At least 20% spare terminals for external connections shall be provided on each panel and these spare terminals shall be uniformly distributed on all terminal blocks.

c) There shall be minimum clearance of 250mm between the terminal blocks and the cable gland plate and 150mm between two rows of terminal blocks.

6.24 Cable Lugs

Heavy duty bolt-on termination tinned copper lugs of compression type shall be used in the switchgear for power cable termination. The supply of electrolytic tinned copper cable lugs for power cables forms part of the supply of equipment. Cable lugs shall comply with IS-8309.

6.25 Cable Glands

The supply of cable glands forms part of the supply of equipment. Cable glands shall conform to BS-6121. Cable glands shall be of double compression type.

6.26 Panel Earthing

Charger panels shall have fully rated GI ground bus with two ground terminals, one at each end of the panel. Each ground terminal shall have two bolt drillings with GI bolts and nuts suitable for connection to purchaser's ground conductor.

7.0 ANNUNCIATION SYSTEM

7.1 Visual indication shall be provided to indicate the operating conditions of the charger by the means of indicating lamps/LED or annunciation facia windows as per EEUA-45D, arranged on the top of the charger panels for following faults:

a) AC supply failure
b) Rectifier fuse failure
c) Surge circuit fuse failure
d) Filter fuse failure
e) Load limiter operated
f) Charger trip/over loaded
g) Battery on boost
h) Charger earth fault
i) Battery fuse blown
j) DC system under voltage

Potential free 'NO' contacts of all above conditions shall be provided for following remote alarms in the Unit Control Panel/ DDCMIS:

k) Battery fuse fails
l) Battery on boost
m) Charger over load
n) Charger trouble (this being a group alarm initiated by any of the faults of charger other than charger over load).

7.2 Suitable potential free contacts for remote indication of above abnormal conditions shall be provided. Multiplication relays, if required, shall be included in the panel. Indications for charger input supply healthy, charger in FLOAT mode and charger in BOOST mode shall be provided.

7.3 All indicating instruments, control & selector switches and indicating lamps shall be mounted on the front side of the Charger. Design of panels shall be based on the following dimensions:

a)	Overall height	: Maximum 2350 mm
b)	Operating handles (Highest and lowest positions reached by operator's hands), Protective mechanical indicators	: Maximum 1800 mm Minimum 350 mm
c)	Doors & panel handles and locks	: Maximum 1800 mm Minimum 300 mm

8.0 NAME PLATE AND MARKING

The name plates shall be made of non-rusting metal / 3 ply Lamicoid and shall have black back ground with white engraved letters and secured by screws. These shall be provided near top edge on the front as well as on rear side of charger. Name plates with full and clear inscriptions shall also be provided on and inside the panels for identification of the various equipment.

9.0 PAINTING

After fabrication, all surfaces shall be cleaned and pre-treated as per IS: 6005. Two coats of lead oxide primer (anti-corrosive) shall be applied after the pre-treatment. Two coats of powder painting with shade no. RAL-7032 or paint shade approved by customer shall be applied for complete panel. Thickness of paint shall be min. 40-50 microns. Protecting pealable compound shall be provided on outside finished surface to protect the painted surface during transportation and site handling.

10.0 PERFORMANCE GUARANTEE

The bidder shall guarantee that chargers offered shall meet the ratings and performance requirements stipulated for various equipment covered in this specification. If the equipment

fails to meet the requirement, the supplier shall replace it with appropriate equipment free of cost without affecting the schedule.

11.0 INSPECTION & TESTING

11.1 The bidder shall confirm compliance to Quality plan enclosed with Section-II of specification. The Quality plan shall be subject to BHEL/ customer approval after award of contract without any commercial or delivery implication. Inspection shall be carried out as per BHEL/ customer approved Quality plan.

11.2 All equipment to be supplied shall be of type-tested quality. The bidder shall furnish all type test reports for BHEL/ customer approval. The Type tests should have been carried out within last ten years from the date of techno commercial bid opening i.e. on the equipment similar to those proposed to be supplied under this contract and the tests should have been either conducted at an independent laboratory or should have been witnessed by a client/ government agency. In absence of such type tests reports or in case such reports are not found to be meeting the specification/ standards requirements, vendor shall conduct all such type tests without any commercial/ delivery implication to BHEL according to the relevant standards and reports shall be submitted to the owner for approval. (Charges for carrying out all routine tests & type tests are deemed to be included in the charger price).

11.3 The details of Type Tests to be conducted shall be as per Section-I of specification.

11.4 The bidder shall furnish following Type Tests reports for each type & rating of battery charger:

i) Temperature rise test at full load for 8 hours.

ii) Temperature rise test for rectifier assembly at current specified in Data Sheet-A Section-I for 8 hours.

iii) Insulation resistance test

iv) High voltage (power frequency) test on power & control circuits except low voltage electronic circuit

v) Ripple content test at no load, half and full load

vi) Automatic voltage regulation operation test at specified AC supply variations at no load, half and full load

vii) Load limiter operation test

viii) Efficiency and power factor measurement

ix) Input and output surge withstand capacity test. Surge voltage as per ANSI-C37.90a shall be applied for a period of not less than 2 seconds at the following points of the charger operating at 50°C at full load:

a) Across each AC input phases
b) Across AC input line to ground
c) Across DC output terminals
d) Across each DC output terminal to ground

The charger shall not exhibit any component damage and there shall be no deterioration in performance of the charger.

x) Environmental Tests: Steady state performance tests (temperature rise test at full load & load limiter operation test) shall be carried out before & after the following tests.

a) Soak test: The electronic modules shall be subject to continuous operation for a minimum period of 72 hours. During last 48 hours, the ambient temperature shall be maintained at 50°C. The 48 hour test period shall be divided into 4 equal 12 hour segments. The input voltage during each 12 hours shall be nominal voltage for 11 hours followed by 110% of nominal voltage for 30 minutes, followed by 90% of nominal voltage for 30 minutes.

b) Degree of protection test

xi) Complete physical examination

11.5 Rectifier transformers shall be subjected to following routine test:

i) Temperature rise test for 8 hours.

ii) Insulation Resistance test

iii) High voltage test (power frequency) test

11.6 Following routine tests are to be performed on all battery chargers:

i) Complete physical examination

ii) Temperature rise test at full load for 8 hours.

iii) Insulation resistance test

iv) High voltage (power frequency) test

v) Ripple content test at no load, half and full load

vi) AVR operation test at specified AC supply variation at no load, half and full load

vii) Load limiter operation test

viii) Checking of proper operation of annunciation system

ix) Dynamic response test
Overshoot / undershoot in output voltage of the charger corresponding to sudden change in load from 100% to 20% and from 20% to 100%.

x) Burn in test shall be carried out on all electronic modules or panels with modules. During the test the panel / module shall be subjected to ambient temperature of 50°C for 48 hours in energised condition. The temperature rise inside the cubicle shall not exceed 10°C during the test.

xi) Degree of protection test
The charger shall be checked for gasket arrangement as per the drawings.

11.7 Following routine tests shall be carried out on annunciation system:

i) Annunciation assembly and module shall be functionally tested as per EEUA-45D.

ii) Burn in test as specified above in cl. No. 10.5 (x) above.

11.8 All material used for the construction of the equipment / items shall be new and shall be in accordance with the requirements of this specification. Materials utilised shall be those, which have established themselves for use in such applications.

11.9 All acceptance and routine tests as per relevant standards and specification, shall be carried out by the manufacturer. Charges for all these routine and acceptance tests for all the materials shall be deemed to be included in the bid price.

12.0 INSTRUCTION MANUAL

Instruction manuals for the installation, operation and maintenance of battery charger, battery fuse and variable metallic resistor and shunt to be supplied at least two months before the date of despatch of equipment.

The installation and maintenance manual of battery charger, battery fuse and variable metallic resistor and shunt shall contain the following.

A) General description giving type and rating of equipment.

B) Technical data.

C) Salient constructional details.

D) Instruction to be followed on receipt at site.

E) Erection procedures and checks (handling at site, erection, pre-commissioning).

F) Commissioning procedures and site tests.

G) Routine, periodic and preventive inspection and maintenance procedures.

H) Safety rules.

I) Possible faults, their causes and remedies.

J) Catalogues, literature and drawings.

K) Outline dimension drawings showing constructional features, relevant cross sectional views and earthing details, operator oriented description of equipment and accessories.

L) Operating procedures, maintenance procedures & precautions to be taken during operation and maintenance work.

13.0 SPARES

13.1 Bidder to furnish the E & C spares as per BOQ cum Price Schedule.

14.0 TOOLS AND TACKLE (IF APPLICABLE)

Tools & tackle, which are essential to facilitate assembly, adjustments, maintenance & dismantling of equipment shall be provided as part of equipment supplied. The above tools shall be supplied along with the initial consignment of equipment so as to be available prior to erection but may not be used for erection purposes.

15.0 AS-BUILT DRAWINGS

Though only supply of equipment is under bidder's scope, bidder may note that all as-built correction (as given by purchaser to vendor) shall have to be incorporated in the originals by the vendor and copies of the as-built corrected drawings / documents as per requirement shall be submitted by the vendor.

16.0 STATUTORY AND REGULATORY REQUIREMENTS

Statutory and regulatory requirements as per IE rule 1956 with amendment-3 rule 1986, rules Nos. 35, 42, 50 & 51 shall be adhered to.

ANNEXURE-I

LIST OF APPLICABLE STANDARDS

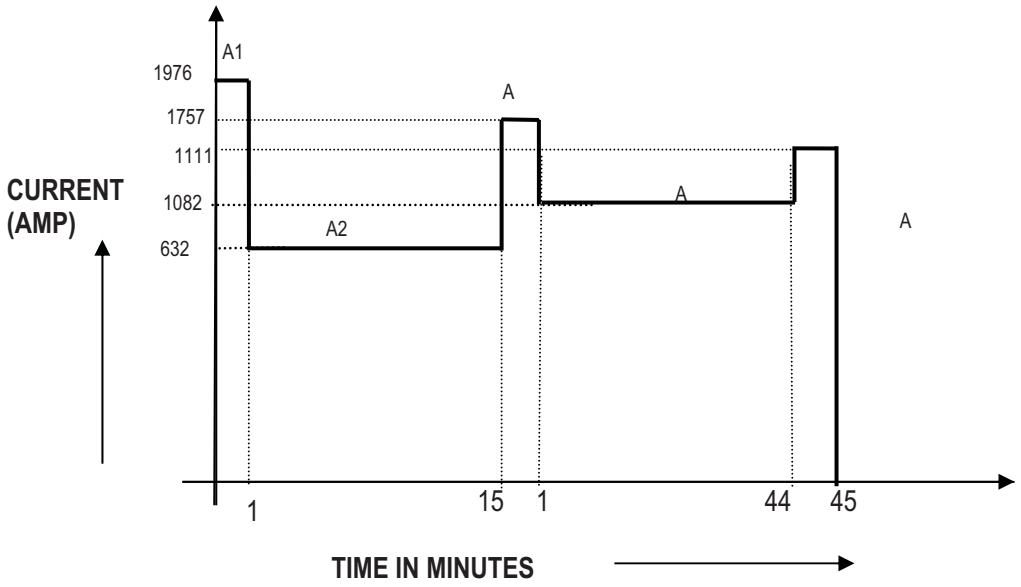
1.	GUIDE FOR SURGE WITHSTAND CAPABILITY TESTS	ANSI-C 37.90a
2.	COLOURS FOR READY MIX PAINTS	IS-5
3.	PVC INSULATED CABLE FOR WORKING VOLTAGE 1100V	IS-694
4.	INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS	IS-1248
5.	DOP FOR LV SWITCHGEAR AND CONTROL GEAR PART-1	IS-13947
6.	SPECIFICATION FOR LV SWITCHGEAR AND CONTROL GEAR	IS-13947
7.	ELECTRICAL RELAYS FOR POWER SYSTEM PROTECTION	IS-3231
8.	APPLICATION GUIDE FOR ELECTRICAL RELAYS FOR AC SYSTEM	IS-3842
9.	MONO CRYSTALLINE SEMICONDUCTOR RECTIFIER CELLS & STACKS	IS-3895
10.	MONO CRYSTALLINE SEMICONDUCTOR RECTIFIER ASSEMBLIES & EQUIPMENT	IS-4540
11.	CODE OF PRACTICE FOR PHOSPHATING OF IRON & STEEL	IS-6005
12.	SAFETY CODE FOR SEMICONDUCTOR RECTIFIER EQUIPMENT	IS-6619
13.	CONTROL SWITCHES (SWITCHING DEVICES FOR CONTROL AND AUXILIARY CIRCUITS INCLUDING CONTACTOR RELAYS) FOR VOLTAGE UPTO 1000V AC OR 1200V DC	IS-6875
14.	ENVIRONMENTAL TESTING FOR ELECTRONIC & ELECTRICAL ITEMS	IS-9000
15.	LV FUSE FOR VOLTAGES BELOW 1000V AC OR 1500V DC	IS-13703
16.	PERFORMANCE REQUIREMENT FOR ALARM ANNUNCIATION SYSTEM	EEUA-45D
17.	POWER TRANSFORMERS	IS-2026
18.	INDIAN ELECTRICITY RULES & INDIAN ELECTRICITY ACTS	

NOTE: Equipment complying with other internationally accepted standards such as IEC, BS, VDE etc. will also be considered if they ensure performance and constructional features equivalent or superior to standards listed above. In such a case, the bidder shall clearly indicate the standards adopted, furnish a copy in English of the latest revision of the standards along with copy of all official amendments and revisions and shall clearly bring out the salient features for comparison.

ANNEXURE-II

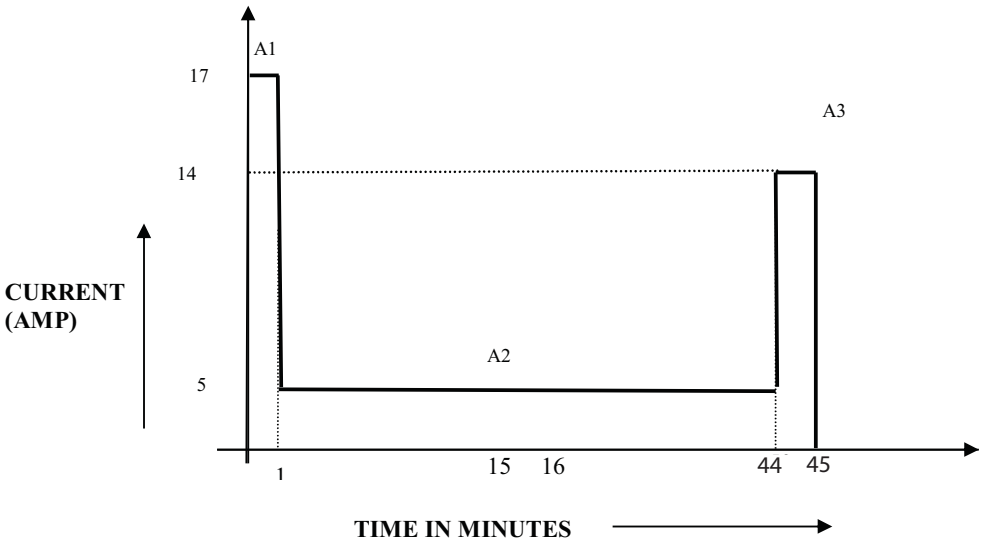
LOAD DUTY CYCLE

LOAD DUTY CYCLE OF MAIN PLANT



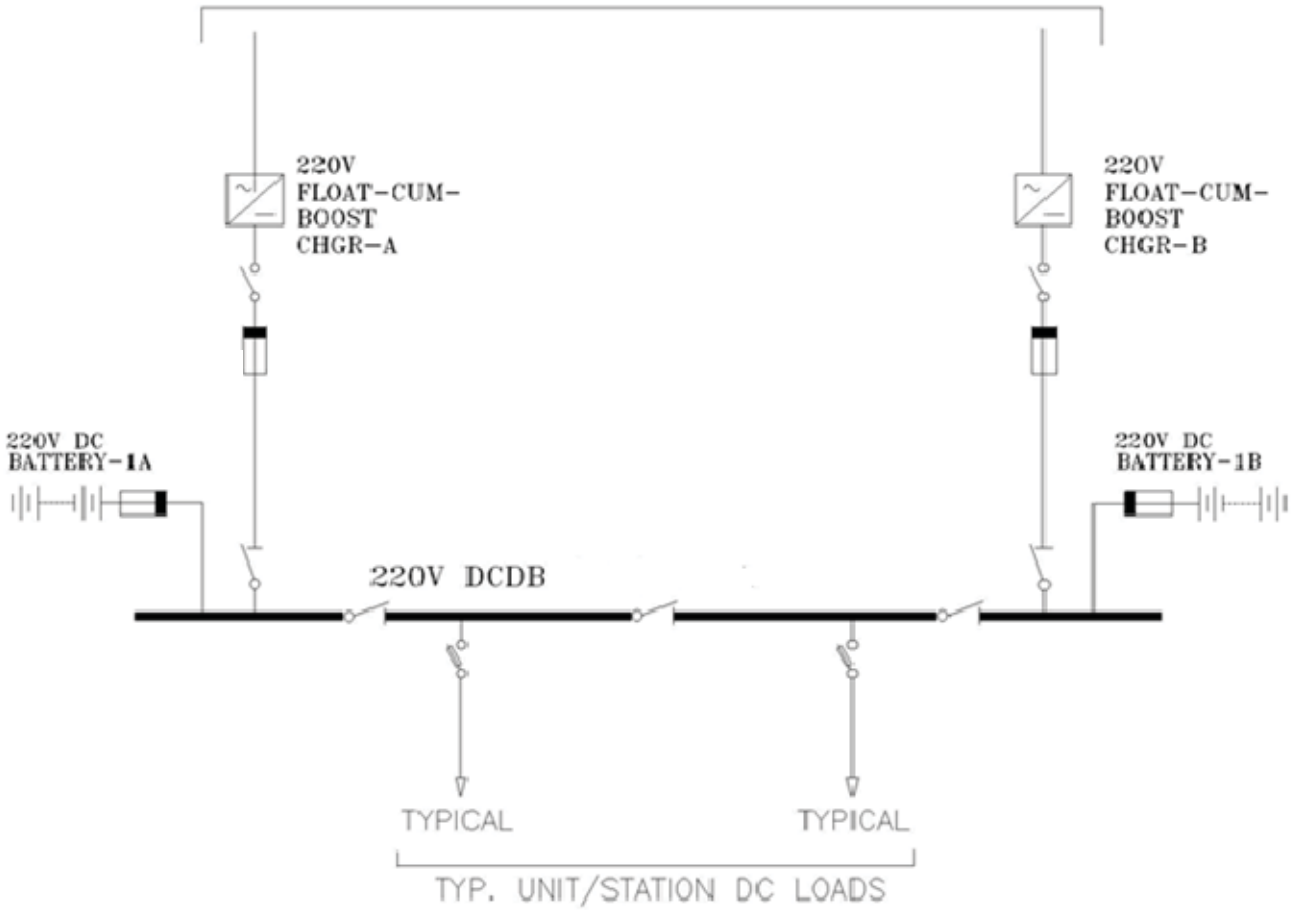
ANNEXURE -II

LOAD DUTY CYCLE OF RWPH



ANNEXURE-III

ONE LINE DIAGRAM FOR 220V DC SYSTEM



ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
AC CONTACTORS	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
AC CONTACTORS	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
AC CONTACTORS	3	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	TAKEN OVER BY SCHNEIDER
AC CONTACTORS	4	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
AC CONTACTORS	5	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000	
AC LOAD BREAK SWITCH	1	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
AC LOAD BREAK SWITCH	2	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
AC LOAD BREAK SWITCH	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
AC LOAD BREAK SWITCH	4	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687	
AC LOAD BREAK SWITCH	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
AC MCCB	1	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
AC MCCB	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
AC MCCB	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
AC MCCB	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
AC MCCB	5	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
AC MCCB	6	C02	CROMPTON GREAVES	RAIL TRANSPORTATION SYSTEMS,VANDANA BUILDING, 11, TOLSTOY MARG, TOLSTOY MARG, NEW DELHI, DL 110001	011 3041 6300	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
AIR CIRCUIT BREAKER	1	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
AIR CIRCUIT BREAKER	2	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015,	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
AIR CIRCUIT BREAKER	3	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
AIR CIRCUIT BREAKER	4	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
AIR CIRCUIT BREAKER	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
AUXILIARY RELAYS	1	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
AUXILIARY RELAYS	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
AUXILIARY RELAYS	3	E1075	JYOTI LTD.	JYOTI LIMITED, E&CS DIVISION,3/15, BIDC, GORWA,VADODARA - 390 016, E-MAIL ID: ECS@JYOTI.COM	Ph. No.:+91-265-2281214 , Fax No.:+91-265-2281214	
AUXILIARY RELAYS	4	E1099	OEN INDIA LTD	29/1479, VYTILLA, COCHIN - 682 019 KERALA, INDIA	Phone : +91 484 2301132, 2303709 Fax : +91 484 2302287, 2302221 sales@oenindia.com	
AUXILIARY RELAYS	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
BIMETAL RELAYS	1	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
BIMETAL RELAYS	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
BIMETAL RELAYS	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
BIMETAL RELAYS	4	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	TAKEN OVER BY SCHNEIDER
CABLE GLANDS	1	E1201	ALLIED TRADERS & EXPORTERS	C-124 A, SECTOR-2, NOIDA -201 301, UTTAR PRADESH, INDIA	Mr. Vijay Mohan Sood +(91)-(120)-2525694 +(91)-(120)-3052594 +(91)-(11)-23287156 vijay_mohansood@yahoo.com	
CABLE GLANDS	2	E1017	ARUP ENGG & FOUNDARY WORKS	391/119,PRINCE ANWAR SHAH ROAD, CALCUTTA-700068	033 2473 0850	

TECHNICAL SPECIFICATION FOR BATTERY CHARGER
ANNEXURE-IV SUBVENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
CABLE GLANDS	3	E1206	BALIGA LIGHTING EQPT.PVT.LTD.	63A,CP RAMASWAMY ROAD, ALWARPET,P.B.No 6910, CHENNAI-600018	44-24995505,22680990-4	
CABLE GLANDS	4	E1036	COMMET BRASS PRODUCTS	NUTAN CHEMICAL COMPOUND, WALBHAT ROAD, GOREGAON, MUMBAI-400063	91-022-26852961/62/63 comet@vsnl.net	
CABLE GLANDS	5	DW08	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGOAN (EAST). MUMBAI 400 063.	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/ 022-29270878.	
CABLE GLANDS	6	E1044	ELECTROMAC INDUSTRIES	27/28AF NEW EMPIRE IND.ESTT., R.KRISHNA MANDIR RD.JB NGR ,ANDHERI(E),MUMBAI-400059	91-22-28324829 / 66919034 devang@electromacglands.com	
CABLE GLANDS	7	I01	INCAB	HARE STREET,KOLKATA,WEST BENGAL-700001	91-33-2480161/62/63/64 Fax : 91-33-2485766	
CABLE LUGS	1	E1040	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGOAN (EAST).	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/	
CABLE LUGS	2	E1149	UNIVERSAL MACHINES LTD.	4,B.B.D.BAG (EAST) 90,STEPHEN HOUSE,5TH FLR CALCUTTA-700001	033 2282 2540	
D.C. MCCB	1	C02	CROMPTON GREAVES	RAIL TRANSPORTATION SYSTEMS,VANDANA BUILDING, 11, TOLSTOY MARG, TOLSTOY MARG, NEW DELHI, DL 110001	011 3041 6300	
D.C. MCCB	2	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
D.C. MCCB	3	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL,	044-49681447	
D.C. MCCB	4	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
EARTH LEAKAGE CB	1	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
EARTH LEAKAGE CB	2	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
EARTH LEAKAGE CB	3	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
EARTH LEAKAGE CB	4	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
EARTH LEAKAGE CB	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
EARTH LEAKAGE CB	6	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
EARTH LEAKAGE CB	7	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222	
EARTH LEAKAGE CB	8	E1088	MDS SWITCHGEAR LTD	314-317SHAH NAHAR ESTATE	011 - 25793021	
EARTH LEAKAGE CB	9	E1120	S&S POWER SWITCHGEAR LTD,	NEW NO. 67, OLD NO. 19, DR. RANGA ROAD, MYLAPORE, CHENNAI - 600004	044 - 24988056, 044 - 24988057, 044 - 24988058	
DC CONTACTORS	1	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
DC CONTACTORS	2	E1030	BHEL (BHOPAL)	HEAVY ELECTRICAL PLANT		
DC CONTACTORS	3	E1044	ELECTROMAC INDUSTRIES	27/28AF NEW EMPIRE IND.ESTT., R.KRISHNA MANDIR RD.JB NGR ,ANDHERI(E),MUMBAI-400059	91-22-28324829 / 66919034 devang@electromacglands.com	
DC CONTACTORS	4	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
DC CONTACTORS	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
DC CONTACTORS	6	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	TAKEN OVER BY SCHNEIDER
DC CONTACTORS	7	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
CONTROL SWITCHES/ SELECTOR SWITCH	1	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687	
CONTROL SWITCHES/ SELECTOR SWITCH	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
CONTROL SWITCHES/ SELECTOR SWITCH	3	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479000	
CONTROL SWITCHES/ SELECTOR SWITCH	4	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
CONTROL SWITCHES/ SELECTOR SWITCH	5	SRC01	M/s Shrenik & Co.	39A/3, PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ-BAVLA ROAD, CHANGODAR,		
CONTROL SWITCHES/ SELECTOR SWITCH	6	RE05	RECOM PVT. LTD.	M/S RECOM PVT. LTD.,16A , 2ND FLOOR A, WING RAJ INDUSTRIAL COMPLEX, MILITARY	Mr. Chandrashekar Kamath (MD) : 09820249503	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	2	E1066	INDCOIL	PLOT NO. A- 150/ 151, 23RD U ROAD, WAGLE ESTATE, THANE WEST, CST RD, FRIENDS COLONY, HALLOW PUL, KURLA WEST, MUMBAI, MAHARASHTRA 400070	Phone:022 2583 8305	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	3	K18	KAPPA ELECTRICALS	KAPPA ELECTRICALS, KAPPA CONSOLIDATED PVT. LTD., 14, CART TRACK ROAD, MADUVANKARAI, CHENNAI - 600 042, INDIA.	PHONE: +91 - 44 - 22454709, 22454516, 22450794, 22450795 FAX: +91 - 44 - 22351662, 22451693 E-MAIL: mira@kappaelectricals.com sales@kappaelectricals.com	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	4	E1082	LOGICSTAT	B-160, INDUSTRIAL AREA, C BLOCK RD, OKHLA I, OKHLA INDUSTRIAL AREA, NEW DELHI, DL 110020	011 2681 0032	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	5	E1106	PRECISE ELECTRICALS	47A-49A,CHAKALA ROAD ANDHERI(E),MUMBAI-99 MUMBAI, MAHARASHTRA, INDIA PIN-400 099	022-8323402 / 022-8216433	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	6	E1128	UNILEC ENGINEERS PVT. LTD.	PLOT NO: R-247, T.T.C. INDUSTRIAL AREA, M.I.D.C , RABALE, NAVI MUMBAI- 400 701 INDIA	+91-22- 27607787 / 27607927 +91-22- 27607997	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	7	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	FOR CONTROL TRANSFORMER ONLY
LT- CURRENT TRANSFORMER	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
LT- CURRENT TRANSFORMER	2	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
LT- CURRENT TRANSFORMER	3	E1066	INDCOIL	PLOT NO. A- 150/ 151, 23RD U ROAD, WAGLE ESTATE, THANE WEST, CST RD, FRIENDS COLONY, HALLOW PUL, KURLA WEST, MUMBAI, MAHARASHTRA 400070	Phone:022 2583 8305	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
LT- CURRENT TRANSFORMER	4	K18	KAPPA ELECTRICALS	KAPPA ELECTRICALS, KAPPA CONSOLIDATED PVT. LTD., SOUTHERN ELECTRIKS 14, CART TRACK ROAD, MADUVANKARAI, CHENNAI - 600 042, INDIA.	PHONE: +91 - 44 - 22454709, 22454516, 22450794, 22450795 FAX: +91 - 44 - 22351662, 22451693 E-MAIL: mira@kappaelectricals.com sales@kappaelectricals.com	
LT- CURRENT TRANSFORMER	5	E1104	PRAGATI ELECTRICALS	280/3,II POKHRAN RD	5341779,5427041	
LT- CURRENT TRANSFORMER	6	E1106	PRECISE ELECTRICALS	47A-49A,CHAKALA ROAD ANDHERI(E),MUMBAI-99 MUMBAI, MAHARASHTRA, INDIA PIN-400 099	022-8323402 / 022-8216433	
LT- CURRENT TRANSFORMER	7	E1128	SILKAANS ELECT.MFG.CO.PVT.LTD	PLOT NO: R-247, T.T.C. INDUSTRIAL AREA, M.I.D.C , RABALE, NAVI MUMBAI- 400 701 INDIA	+91-22- 27607787 / 27607927 +91-22- 27607997	
LT- CURRENT TRANSFORMER	8	E1111	PRAYOG ELECTRICALS PVT. LTD.	GROUND FLOOR, THAKORE INDUSTRIAL COMPUND, STATION ROAD, VIDYA VIHAR (W), NATHANI ROAD , OPP. AMIBIKA TEMPLE,MUMBAI Mumbai - 400086, Maharashtra, India	91-22-25164288/25133146 Mr. P. U. PATWARDHAN (MANAGING DIRECTOR)	
LT- CURRENT TRANSFORMER	9	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
LT- CURRENT TRANSFORMER	10	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	
LT- POTENTIAL TRANSFORMER	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
LT- POTENTIAL TRANSFORMER	2	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
LT- POTENTIAL TRANSFORMER	3	E1066	INDCOIL	PLOT NO. A- 150/ 151, 23RD U ROAD, WAGLE ESTATE, THANE WEST, CST RD, FRIENDS COLONY, HALLOW PUL, KURLA WEST, MUMBAI, MAHARASHTRA 400070	Phone:022 2583 8305	
LT- POTENTIAL TRANSFORMER	4	K18	KAPPA ELECTRICALS	KAPPA ELECTRICALS, KAPPA CONSOLIDATED PVT. LTD., SOUTHERN ELECTRIKS 14, CART TRACK ROAD, MADUVANKARAI, CHENNAI - 600 042, INDIA.	PHONE: +91 - 44 - 22454709, 22454516, 22450794, 22450795 FAX: +91 - 44 - 22351662, 22451693 E-MAIL: mira@kappaelectricals.com sales@kappaelectricals.com	

TECHNICAL SPECIFICATION FOR BATTERY CHARGER
ANNEXURE-IV SUBVENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
LT- POTENTIAL TRANSFORMER	5	E1104	PRAGATI ELECTRICALS	280/3,II POKHRAN RD	5341779,5427041	
LT- POTENTIAL TRANSFORMER	6	E1106	PRECISE ELECTRICALS	47A-49A,CHAKALA ROAD ANDHERI(E),MUMBAI-99 MUMBAI, MAHARASHTRA, INDIA PIN-400 099	022-8323402 / 022-8216433	
LT- POTENTIAL TRANSFORMER	7	E1128	SILKAANS ELECT.MFG.CO.PVT.LTD	PLOT NO: R-247, T.T.C. INDUSTRIAL AREA, M.I.D.C , RABALE, NAVI MUMBAI- 400 701 INDIA	+91-22- 27607787 / 27607927 +91-22- 27607997	
LT- POTENTIAL TRANSFORMER	8	E1111	PRAYOG ELECTRICALS PVT. LTD.	GROUND FLOOR, THAKORE INDUSTRIAL COMPUND, STATION ROAD, VIDYA VIHAR (W), NATHANI ROAD , OPP. AMIBIKA TEMPLE,MUMBAI Mumbai - 400086, Maharashtra, India	91-22-25164288/25133146 Mr. P. U. PATWARDHAN (MANAGING DIRECTOR)	
LT- POTENTIAL TRANSFORMER	9	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	
DC SWITCH	1	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
DC SWITCH	2	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687	
DC SWITCH	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
FUSE BASE	1	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222	
FUSE BASE	2	G01	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
FUSE BASE	3	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
FUSE BASE	4	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
FUSE BASE	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 ;amit.bhadauria@siemens.com	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
FUSE BASE	6	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
FUSE BASE	7	S02	SPACEAGE SWITCHGEARS LTD.	68 & 13-A INDUSTRIAL DEVELOPMENT COLONY, MEHRAULI ROAD GURGAON, HARYANA-122001	0124-2302711, 4085091	
FUSE BASE	8	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
FUSE BASE	9	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
FUSE BASE	10	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
HRC FUSES	1	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222	
HRC FUSES	2	G01	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
HRC FUSES	3	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
HRC FUSES	4	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
HRC FUSES	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 ;amit.bhadauria@siemens.com	
HRC FUSES	6	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
HRC FUSES	7	S02	SPACEAGE SWITCHGEARS LTD.	68 & 13-A INDUSTRIAL DEVELOPMENT COLONY, MEHRAULI ROAD GURGAON, HARYANA-122001	0124-2302711, 4085091	
HRC FUSES	8	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
HRC FUSES	9	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
HRC FUSES	10	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
INTERPOSING RELAY	1	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
INTERPOSING RELAY	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
INTERPOSING RELAY	3	E1075	JYOTI LTD.	JYOTI LIMITED, E&CS DIVISION,3/15, BIDC, GORWA,VADODARA - 390 016, E-MAIL ID: ECS@JYOTI.COM	Ph. No.:+91-265-2281214 , Fax No.:+91-265-2281214	
INTERPOSING RELAY	4	E1099	OEN INDIA LTD	29/1479, VYTILLA, COCHIN - 682 019 KERALA, INDIA	Phone : +91 484 2301132, 2303709 Fax : +91 484 2302287, 2302221 sales@oenindia.com	
INTERPOSING RELAY	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
INDICATING LAMPS	1	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000	
INDICATING LAMPS	2	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	6832259,6918834-37	
INDICATING LAMPS	3	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
INDICATING LAMPS	4	E1153	VAISHNO(HOTLINE SWGR.& CONTROL)	G-19, SECTOR - 11, NOIDA - 201301, UTTAR PRADESH, INDIA	8377805157 9818338922	
INDICATING LAMPS	5	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	9818338922	
INDICATING LAMPS	6	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
INDICATING LAMPS	7	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
MCB	1	E1088	MDS SWITCHGEAR LTD	314-317SHAH NAHAR ESTATE	011 - 25793021	
MCB	2	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222	
MCB	3	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
MCB	4	E1120	S&S POWER SWITCHGEAR LTD,	NEW NO. 67, OLD NO. 19, DR. RANGA ROAD, MYLAPORE, CHENNAI - 600004	044 - 24988056, 044 - 24988057, 044 - 24988058	
PROTECTION - RELAYS (PNUEMATIC)	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
PROTECTION - RELAYS (PNUEMATIC)	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
PROTECTION - RELAYS (PNUEMATIC)	3	A35	GE-MULTILINE, GE INDIA INDUSTRIAL PVT. LTD.	NO. 90- B, ELECTRONICS CITY, HOSUR ROAD, BENGALURU - 560016, KARNATAKA	(080) 41314617, 9945478935	
PROTECTION - RELAYS (PNUEMATIC)	4	SC01	SCHWEITZER ENGG. LAB (SEL)	406, BHIKAJI CAMA BHAVAN, BHIKAJI CAMA PLACE, BHIKAJI CAMA PLACE, MOHAMMADPUR, RK PURAM, NEW DELHI, DL 110066	011 4152 7899	
PROTECTION - RELAYS (PNUEMATIC)	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
PROTECTION - RELAYS (PNUEMATIC)	6	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
PROTECTION - RELAYS (PNUEMATIC)	7	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
PROTECTION - RELAYS (PNUEMATIC)	8	C01	AVK-SEG & CONTROLS(I) LTD	C-60,NOIDA PHASE-II	6918834-37	
PROTECTION - RELAYS (NUMERICAL)	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
PROTECTION - RELAYS (NUMERICAL)	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
PROTECTION - RELAYS (NUMERICAL)	3	A35	GE-MULTILINE, GE INDIA INDUSTRIAL PVT. LTD.	NO. 90- B, ELECTRONICS CITY, HOSUR ROAD, BENGALURU - 560016, KARNATAKA	(080) 41314617, 9945478935	
PROTECTION - RELAYS (NUMERICAL)	4	SC01	SCHWEITZER ENGG. LAB (SEL)	406, BHIKAJI CAMA BHAVAN, BHIKAJI CAMA PLACE, BHIKAJI CAMA PLACE, MOHAMMADPUR, RK PURAM, NEW DELHI, DL 110066	011 4152 7899	
TERMINAL BLOCKS	1	C01	WAGO-CONTROLS	C 27, GREATER NOIDA, SECTOR 58, C BLOCK, SECTOR 58, NOIDA, UTTAR PRADESH 201307	0120-2580409/10	
TERMINAL BLOCKS	2	E1038	CONNECT WELL	309A/4, 3RD FLOOR, KALKAJI, OKHLA IND AREA PH-2, GOVINDPURI, NEW DELHI, DL 110019	9811881085 09871419996 011-65908877	
TERMINAL BLOCKS	3	E1047	ELMEX CONTROLS PVT. LTD.	12,G.I.D.C.ESTATE,MUKARPURA ROAD,VADODARA-390010	9374631074	

TECHNICAL SPECIFICATION FOR BATTERY CHARGER
ANNEXURE-IV SUBVENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
TERMINAL BLOCKS	4	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
TERMINAL BLOCKS	5	E1142	TECHNOPLAST	OPP.I.M.INTER COLLEGE, BEGUM SARAI KHURD ROAD, AMROHA - 244221, U.P.	PH:- 05922 264006 CELL NO:- 9012676000, 9319520799, 9319582467	
TERMINAL BLOCKS	6	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	TEL.- +912066745000 Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126 contact person : Vishwa bandhu E-mail:d.gupta@pmipl-online.com ;admin@pmipl-online.com	
TERMINAL BLOCKS	7	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
TIMERS - PNEUMATIC	1	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000	
TIMERS - PNEUMATIC	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
TIMERS - PNEUMATIC	3	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
TIMERS - PNEUMATIC	4	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	TAKEN OVER BY SCHNEIDER
TIMERS - PNEUMATIC	5	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
TIMERS - PNEUMATIC	6	E01	ELECTRONIC AUTOMATION PVT. LTD.	20, KHB INDUSTRIAL AREA YELAHANKA BANGLORE-560064	080 -28567561 / 080 -28567562 / 080 -42802345	
TIMERS - ELECTRONIC	1	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
TRANSDUCERS	1	E1021	AUTOMATIC ELECTRIC LTD.	ADDRESS : 96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
TRANSDUCERS	2	E1202	SOUTHERN TRANSDUCERS	INTERTECH B-83, FLATTED FACTORY COMPLEX, NEAR MODI MILLS, OKHLA, NEW DELHI-110020	Mr. Gurmohit Singh 011-41020365 / 9891402128	
ENERGY METER (ANALOG)	1	B07	BHEL (EDN)	MYSORE ROAD,BANGALORE-560026	080-26998500	
ENERGY METER (ANALOG)	2	E1129	SIMCO ENGG. LTD	NO. 126, K ROAD, TIRUCHIRAPPALLI -620001, TAMIL NADU	Mr. Madaswamy Muthu +(91)-(431)-4046223 +(91)-(431)-4046210 +(91)-9786600915	

TECHNICAL SPECIFICATION FOR BATTERY CHARGER
ANNEXURE-IV SUBVENDOR LIST

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
ENERGY METER (ANALOG)	3	R01	RISHABH INST.PVT LTD	RISHABH INSTRUMENTS PVT. LTD. F-31, MIDC, SATPUR NASHIK - 422007 MAHARASHTRA INDIA	marketing@rishabh.co.in 91-253 2202202/203 Fax: 91 253 2351064	
ENERGY METER (ANALOG)	4	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
ENERGY METER (ANALOG)	5	CON1	CONZERVE SYSTEMS PVT. LTD.(SCHNEIDER)	87, 1ST FLOOR INDUSTRIAL DEVELOPMENT COLONY (IDC) MEHRAULI ROAD, UGURGAON 122001 HARYANA, INDIA.	4268899, 9910695701	
ENERGY METER (DIGITAL)	1	CON1	CONZERVE SYSTEMS PVT. LTD.(SCHNEIDER)	87, 1ST FLOOR INDUSTRIAL DEVELOPMENT COLONY (IDC) MEHRAULI ROAD, UGURGAON 122001 HARYANA, INDIA.	4268899, 9910695701	
ENERGY METER (DIGITAL)	2	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	
AMMETER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
AMMETER	2	R01	RISHABH INST.PVT LTD	RISHABH INSTRUMENTS PVT. LTD. F-31, MIDC, SATPUR NASHIK - 422007 MAHARASHTRA INDIA	marketing@rishabh.co.in 91-253 2202202/203 Fax: 91 253 2351064	
AMMETER	3	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	
VOLTMETER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
	2	R01	RISHABH INST.PVT LTD	RISHABH INSTRUMENTS PVT. LTD. F-31, MIDC, SATPUR NASHIK - 422007 MAHARASHTRA INDIA	marketing@rishabh.co.in 91-253 2202202/203 Fax: 91 253 2351064	
VOLTMETER	3	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	
MPCB	1	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
MPCB	2	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
MPCB	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
MPCB	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
MPCB	5	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
MPCB	6	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
MULTIFUNCTION METER	1	CON1	CONZERVE SYSTEMS PVT. LTD./ SCHNEIDER ELECTRIC INDIA PVT. LTD.	87, 1ST FLOOR INDUSTRIAL DEVELOPMENT COLONY (IDC) MEHRAULI ROAD, GURGAON 122001 HARYANA, INDIA.	4268899, 9910695701	TAKEN OVER BY SCHNEIDER
MULTIFUNCTION METER	2	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	
RCCB	1	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
RCCB	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
RCCB	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
RCCB	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
RCCB	5	L01	L&T	32, SHIVAJI MARG, P.O. BOX- 6223, NEW DELHI-110015	011-41419554/59	
RCCB	6	C02	CROMPTON GREAVES	RAIL TRANSPORTATION SYSTEMS,VANDANA BUILDING, 11, TOLSTOY MARG, TOLSTOY MARG, NEW DELHI, DL 110001	011 3041 6300	
VAF METER (DIGITAL)	1	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	

	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 1 OF 7	REVIEWED BY: A.MANDAL V. TALWAR O. P. NIRANJANE S.D. SINGH	APPROVED BY: QUALITY ASSURANCE 10 APR 2008 WORKS NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	*VALID UPTO :* 9-APR-11		

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY M	AGENCY C	AGENCY N	
1.	2.	3.	4.	5.	6		7.	8.	9.	D*	10.			
Note	1. A list of major components / bought out items is indicated at Appendix A. Makes for these will be proposed by the manufacturer along with the Endorsement Sheet for NTPC acceptance. 2. Documents identified in the SQP for NTPC verification will be maintained. However, other documents i.e. IR, IPIR & Mfr's TCs mentioned in the QP will also be maintained by the Manufacturer, which NTPC may verify on surveillance basis at the time of final inspection. QC Records in soft form are also acceptable.													
1.0	**Raw Material:**													
1.1	M.S. Sheet (CRCA)	1. Grade	Major	Visual	100%	-	Mfr drg	Mfr drg	IR		P	-	-	IR= Inspection record
		2.Thickness & Finish	Major	Physical	Sample/lot	-	NTPC Specification	NTPC Specification	-do-		P	-	-	
1.2	Powder Paint	Shade	Major	Visual	Sample/Lot	-	IS-5(1994) SHADE CARD	NTPC appd drg / data sheet	-do-		P	-	-	
2.0	**Major Bought Out Items (Refer note 1 also)**													
2.1	Power Switches, MCCB Contactor & Relay	1) Type, Rating	Major	Physical	100%	100%	NTPC appd drg / data sheet	NTPC appd drg / data sheet	IR		P	V	V	
		2) Mechanical Operation / functional check	Major	Visual	100%	-	Mfr std.	Mfr std.	-do-		P	-	-	
2.2	MCB, Push Buttons HRC fuse, terminal blocks, control & selector switches, Semiconductor Fuses, Heaters, Thermostat, Lamps, Plug in socket, Neutral Link, Lamp holders and Exhaust Fan, Heat sink	1) Type, Rating	Major	Visual	100%	-	NTPC approved Drg / Data Sheet	NTPC approved Drg / Data Sheet	-do-		P	-	-	
		2) Continuity Test	Major	Electrical	100%	-	Mfr std.	Mfr std.	do-		P	-	-	
2.3	Rectifier bridge Elements	Type, Rating	Major	Visual	100%	100%	NTPC appd drg / Data Sheet	NTPC appd drg / Data Sheet	IR	√	P	V	V	
2.4	Digital Multi Function Meters	1) Type & rating	Major	Visual	100%	100%	NTPC appd drg / data sheet	NTPC appd drg / data sheet	-do-		P	V	V	
		2) Calibration Certificate	Major	Visual	100%	100%	-do-	-do-	Mfr TC	√	V	V	V	
		3) Routine TC	Major	Electrical	100%	100%	-do-	-do-	-do-		V	V	V	
2.5	PVC Insulated Electric Cable	1) Type, size	Major	Visual	100%	At random	NTPC Specification / Data Sheet	NTPC Specification / Data Sheet	IR		P	V	V	All power cables to conform to IS 1554; Control wires to conform to IS 694
		2) I.R. Test	Major	Electrical	Sample/lot	-	-do-	-do-	-do-		P	-	-	

LEGEND : * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"

Note: NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of inspection

एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 2 OF 7	REVIEWED BY: A.MANDAL V. TALWAR O. P. NIRANJAN S.D. SINGH	APPROVED BY: QUALITY ASSURANCE 10 APR 2008 NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	VALID UPTO : 9-APR-11		

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1.	2.	3.	4.	5.	6		7.	8.	9.		10.			
		3) H.V. Test	Major	Electrical	Sample/lot	-	-do-	-do-	-do-		P	-	-	
2.6	Transducer	1) Routine TC & calibration report	Major	Electrical	100%	100%	NTPC Specification / Data Sheet / IS 12784	NTPC Specification / Data Sheet / IS 12784	Mfr TC	√	P	V	V	
		2) Type, Rating	Major	Visual	100%	100%	-do-	-do-	do-		P	V	V	
2.7	Current Transformer, Dimmerstat Control Transformer	1) Routine Tests	Major	Electrical	100%	10%	NTPC appd drg / Data Sheet / IS 2705	NTPC appd drg / Data Sheet / IS 2705	Mfr TC	√	V	V	V	
		2) Type, Rating	Major	Visual	100%	10%	-do-	-do-	IR		P	V	V	
2.8	Busbar	1) Dimensional checkup	Major	Physical	100%	-	NTPC appd drg / Data Sheet	NTPC appd drg / Data Sheet	-do-		P	-	-	
		2) Conductivity Test	Major	Electrical	Sample / lot	-	-do-	-do-	-do-		P	-	-	
2.9	Annunciation facia (If Applicable)	All routine tests as per EEUA-45D	Major	Electrical	100%	100%	NTPC Specification / appd drg / data sheet	NTPC Specification / appd drg / data sheet	Mfr TC		P	V	V	
2.10	Visual Indications for charger status using LED / indicating lamps (if annunciation facia not used)	Electronic card used for indication (Refer Electronic card assembly & location at cl. no. 3.4, for checks)					NTPC Specification / appd drg / data sheet	NTPC Specification / appd drg / data sheet						
2.11	Rectifier transformer	1).Rating	Major	Visual	100%	100%	NTPC approved data sheet	NTPC approved data sheet	IR	√	P	V	V	
		2) Dimensional check	Major	Physical	100%	100%	Mfr drg.	Mfr drg.	-do-	√	P	V	V	
		a) Overall size	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		b) Mounting details	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		3) Terminal Board	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		4) Polarity Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		5) I.R. Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		6) Routine Tests												
		a) Voltage Ratio Test	Major	Electrical	100%	100%	NTPC approved data sheet / NTPC spec./ IEC 146	NTPC approved data sheet / NTPC spec./ IEC 146	IR / Mfr TC	√	P/V	V	V	
		b) DC Resistance Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		c) No Load Test & Measurement of iron losses	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	

LEGEND: " RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"

Note: NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of Inspection

एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 3 OF 7	REVIEWED BY: A.MANDAL V. TALWAR O. P. NIRANJAN S.D. SINGH	APPROVED BY: QUALITY ASSURANCE 10 APR 2008 APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	*VALID UPTO :* 9-APR-11		

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/ N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1.	2.	3.	4.	5.	6		7.	8.	9.		10.			
		d) Measurement of Tap Voltages	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		e) Measurement of Cu. Losses	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		f) High voltage test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		g) Induced High Voltage test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		h) Heat run Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	Temp. rise limited to class A insulation value
2.12	Choke	1) Rating	Major	Physical	100%	100%	NTPC approved data sheet	NTPC approved data sheet	IR	√	P	V	V	
		2) Dimensional check	Major	Physical	100%	100%	Mfr drg.	Mfr drg.	-do-	√	P	V	V	
		a) Overall Size			100%	100%	-do-	-do-	-do-	√	P	V	V	
		b) Mounting details			100%	100%	-do-	-do-	-do-	√	P	V	V	
		3. Terminal Board / Bakelite plate or busbar	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		4. Terminal rating	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		5. Air Gap Measurement	Major	Physical	100%	100%	-do-	-do-	-do-	√	P	V	V	
		6. Continuity test	Major	Elec.	100%	100%	-do-	-do-	-do-	√	P	V	V	
		7. Insulation Resistance	Major	Elec.	100%	100%	NTPC approved data sheet / NTPC spec./ IEC 146	NTPC approved data sheet / NTPC spec./ IEC 146	IR / Mfr TC	√	P/V	V	V	
		8.High Voltage test	Major	Elec.	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		9. DC resistance test	Major	Elec.	100%	100%	-do-	-do-	-do-	√	P/V	V	V	
		10) Heat run Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P/V	V	V	Temp. rise limited to class A insulation value
2.12	Printed Circuit Boards	1) Visual Checks	Major	Physical	100%	-	Mfr drg & NTPC spec.	Mfr drg & NTPC spec.	IR		P	-	-	
		2) Compliance report	Major	-	100%	-	NTPC spec. req. for PCB	NTPC spec. req. for PCB	-do-		P	-	-	
3.0	In process Inspection				-			-						-
3.1	Enclosure fabrication	1) Dimensional checks	Major	Physical	100%	-	Mfr Fabrication Drawing	Mfr Fabrication Drawing	IPIR		P	-	-	IPIR = In process Inspection Report
		2)Diagonal (Skewness)	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		3) Straightness	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		4) Welded Joints	Major	Visual	-do-	-	-do-	-do-	-do-		P	-	-	

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Note: NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of Inspection

एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 4 OF 7	REVIEWED BY: A.MANDAL V. TALWAR O. P. NIRANJAN S.D. SINGH	APPROVED BY: QUALITY ASSURANCE 10 APR 2008 NTPC APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	*VALID UPTO :* 9-APR-11		

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			
					M	C/ N				D*	M	C	N	
1.	2.	3.	4.	5.	6.		7.	8.	9.		10.			11.
		5) Deburring & Finishing of welded joints	Major	Visual	-do-	-	-do-	-do-	-do-		P	-	-	
3.2	Pre treatment of enclosure	1) Degreasing	Major	Physical	-do-	-	IS 6005 / Mfr Std Practice	IS 6005 / Mfr Std Practice	-do-		P	-	-	
		2) Water rinsing	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		3) Derusting	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		4) Water rinsing												
		5) Phosphating	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		6) Water Rinsing	Major	Physical	-do-	-	-do-	-do-	JPIR -		P	-	-	
		7) Hot-Chromating	Major	Physical	-do-	-	-do-	-do-	-do-		P	-	-	
		8) Sealing (If used)												
3.3	Powder Coating	1) Shade, thickness & finish	Major	Cross Hatch	Random	-	-do-	-do-	-do		P	-	-	
		2) Adhesion check by cross hatch method	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
3.4	Electronic card assembly & location	1) Check electronic cards are modular fitted in standard 19" metal racks with guides	Major	Visual	100%	100%	NTPC spec.	NTPC spec.	-do-		P	V	V	
		2) Check for mechanical interlock to avoid wrong insertion of cards	Major	Visual	100%	100%	NTPC spec.	NTPC spec.	-do-		P	V	V	
		3) Check for correct electronic components	Major	Visual	100%	-	Mfr drg.	Mfr Drg.	-do-		P	-	-	
		4) Check for jumpers / track modifications	Major	Visual	100%	random	NTPC spec.	No unplanned jumpers / track modifications			P	V	V	
		5) Check finish of electronic cards	Major	Visual	100%	-	Mfr drg.	No dry soldering	-do-		P	-	-	
		6) Environmental check on cards to remove cards with infant mortal components	Major	Visual	100%	-	Mfr Std.	Mfr std.	-do-		P	-	-	
3.5	Assembly of components & Modules	1. Transformer & choke	Major	Visual	100%	-	Mfr drg	Mfr drg	-do-		P	-	-	

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एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 5 OF 7	REVIEWED BY: A.MANDAL V. TALWAR O. P. NIRANJAN S.D. SINGH	APPROVED BY: 10 APR 2008 QUALITY ASSURANCE APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	*VALID UPTO :* 9-APR-11		

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			
					M	C/ N				D*	M	C	N	
1.	2.	3.	4.	5.	6		7.	8.	9.		10.			11.
		2. Mounting of components such as switches rectifiers stack, fuses, meter and contractor	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		3. Minimum clearance between busbar	Major			-	-do-	-do-	-do-		P	-	-	
		4. Electronic cards location inside panels	Major	Visual	100%	100%	NTPC spec.	Temp. rise of the location should not exceed 10^c over ambient during heat run test	-do-		P	V	V	
3.6	Wiring	1. Bunching	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		2. Marking	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		3. Ferruling	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		4. Lugs crimping	Major	Physical	100%	-	-do-	-do-	-do-		P	-	-	
		5. Continuity	Major	Electrical	100%	-	-do-	-do-	-do-		P	-	-	
		6. Identification labels	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
3.7	Finishing of Equipment	1. Proper pasting of gasket	Major	Visual	100%	-	-do-	-do-	-do-		P	-	-	
		2. Earthing busbar	Major	Physical	100%	-	-do-	-do-	-do-		P	-	-	
	Note : Review of type test clearance from NTPC Engineering													
4.0	**Final Inspection**													
4.1	**Overall**	1. Dimensional & Sheet Thickness	Major	Physical	100%	Random	NTPC approved drawings & data sheet	NTPC approved drawings & data sheet	IR	√	P	W	W	
		2. Gen.Arr. & B.O.M.	Major	Visual	100%	100%	-do-	-do-	-do-	√	P	W	W	
		3. Aesthetic Look, Straightness, Skewness, Door Alignment, Labels etc.	Major	Visual	100%	Random	-do-	-do-	-do-	√	P	W	W	
		4. Provision of lifting arrangement	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		5. Proper earthing	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		6. Gasketing (Check with 1mm wire)	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		7. Gland Plat arrangement	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		8. Mounting arrangement	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	

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एनटीपीसी NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	STANDARD QUALITY PLAN	QP NO.: 0000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 6 OF 7	REVIEWED BY: A.MANDAL V. TALWAR O. P. NIRANJAN S.D. SINGH	APPROVED BY: QUALITY ASSURANCE 10 APR 2008 REMARKS APPROVED NTPC Limited, NOIDA
		CONFORMING TO NTPC SPECIFICATION	*VALID UPTO :* 9-APR-11		

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/ N				M	C	N	
1.	2.	3.	4.	5.	6		7.	8.	9.	D*	10.		
		9. Wiring quality	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
		10 Paint shade, Adhesion and Thickness check	Major	Visual	100%	-do-	-do-	-do-	-do-	√	P	W	W	
4.2	**Electrical Testing**	1) Burn in check at 50°C for 48 hrs in energized condition	Major	Electrical	100%	100%	NTPC specification & appd Data sheet	NTPC specification & appd Data sheet	IR -	√	P	V	V	Burn In test to be performed before offering for NTPC Inspection
		2) AVR operation Test with input voltage variation of +/- 10%	Major	Electrical	100%	100%	-do-	-do-	-do	√	P	W	W	
		a) No Load					-do-	-do-	-do-	√	P	W	W	
		b) Half Load					-do-	-do-	-do-	√	P	W	W	
		c) Full Load					-do-	-do-	-do-	√	P	W	W	
		3) Ripple Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		a) No Load					-do-	-do-	-do-	√	P	W	W	
		b) Half Load					-do-	-do-	-do-	√	P	W	W	
		c) Full Load					-do-	-do-	-do-	√	P	W	W	
		4) Logic simulation / interlocks/ General operation test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		a) Trickle / boost mode selector switch operation	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		b) Auto / manual selector switch operation	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		c) Soft start feature check	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		d) Uniform step-less trickle mode voltage adjustment in auto / manual operation	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		e) Boost charge mode current adjustment from 50 % to 100 % continuously	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		5) Control Circuit and Charger status indication test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		6) Load Limiter Operation	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		7) Heat Run Test	Major	Electrical	One unit	One unit	-do-	-do-	-do-	√	P	*	*	* Witness on one unit if temperature rise test as a type test is waived off.

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NTPC	ITEM /EQUIPMENT : 220 V /110 V BATTERY CHARGER (FLOAT CUM BOOST CHARGER)	**STANDARD QUALITY PLAN** CONFORMING TO NTPC SPECIFICATION	QP NO.: 0000-999-QOE- S - 005 A REV. NO: 00 DATE :10-APR-08 PAGE 7 OF 7 *VALID UPTO :* 9-APR-11	REVIEWED BY: A.MANDAL V. TALWAR O. P. NIRANJAN S.D. SINGH	APPROVED BY: QUALITY ASSURANCE 10 APR 2008 APPROVED NTPC Limited, NOIDA

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			
					M	C/ N				D*	M	C	N	
1.	2.	3.	4.	5.	6		7.	8.	9.		10.			11.
		8) Dynamic response test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		9) Input AC current measurement Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		10) Degree of protection check for IP 4X	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		11) I.R. Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	
		12) H. V. Test	Major	Electrical	100%	100%	-do-	-do-	-do-	√	P	W	W	

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	PRE-QUALIFICATION REQUIRMENTS FOR DC BATTERY CHARGER	PE-PQ-999-508-E002
		REVISION NO. 03 DATE 30/03/2018
		SHEET NO. 1 OF 1

ITEMS:
DC battery Charger, Battery Fuse Box and Discharge Resistor.

Vendor may be considered for evaluation for one or more of the following type of 220V/110 V DC battery chargers:
Type 1 - Static SCR type full wave fully Controlled, Rating 300A and above
Type 2 - IGBT Technology based, Rating 300A and above
Type 3 - SMPS based, Rating 300A and above

SCOPE: Supply : YES; Erection & Commissioning : NO; Supervision of Erection & Commissioning : YES;

1	Vendor should be designer & manufacturer of the applicable type of Battery charger.
2	Availability of type test certificates conducted at independent Lab or witnessed by third party as per IS/ International standards for the applicable type of Battery charger.
3	In-house capability to carry out all routine and acceptance tests as per IS/ International standards for the applicable type of Battery charger.
4	Option -1: Performance certificates for min. 2 years of trouble free operation at two (2) different installations/sites for the applicable type of battery Charger. Performance certificate should be from end user only. OR Option-2: Repeat order received from 2 different purchasers / end users for the applicable type of battery chargers during last 5 years provided the gap between award of two PO's is minimum 2 years. OR Option-3: 1 no. performance certificate (as per Option-1) and 1 no. repeat order (as per Option-2). OR Option-4 : Successful execution of a major order for BHEL-PEM for the applicable type of battery Charger.
5	Minimum two (2) nos. purchase orders for the applicable type of battery charger shall be submitted which should not be more than five(5) years old from the date of application for registration or date of techno- commercial bid opening (as applicable) for establishing continuity in business.

Notes (General points):

1. Consideration of offer shall be subject to customer's approval of bidders, if applicable.
2. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.
3. Any other project specific requirement shall be as per Annexure-I and bidder shall submit relevant supporting documents. Bidder to meet criteria as stated above and as per Annexure- I.
4. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
5. After satisfactory fulfillment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

PREPARED BY	REVIEWED BY	APPROVED BY
30/03/2018	Manish Shukla 30/03/18	30/3/18
NAME: KANHAIYA KUMAR DESIGNATION: MANAGER(E)	NAME: MANISH SHUKLA DESIGNATION: DGM(E)	NAME: RAJNISH GOYAL DESIGNATION: AGM & DH(E)

BHEL PEM-ELECTRICAL

PRE-QUALIFYING REQUIREMENTS FOR DC BATTERY CHARGER
DOC. NO. PE-PQ-999-588-E002, REV. 03 DATED 30.03.18

3X800 MW PATRATU STPS

ANNEXURE-1

PROJECT SPECIFIC CRITERIA AGAINST ENQUIRY

The bidder/ sub vendor should have manufactured and supplied at least two (2) numbers of static automatic voltage regulator type Battery Chargers of highest offered rating or above, at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years.
NOTE: Two different installations means two different project sites or two different contracts.


18.01.2021

Priyanka Agrawal
[Dy. Manager]

HEMA KUSHWAHA
Digitally signed by HEMA KUSHWAHA
DN: cn=HEMA KUSHWAHA, o=BHEL, ou=PEM-ELECT, email=hemakushwaha@bhel.in, c=IN
Date: 2021.01.18 16:47:55 +05'30'

Hema kushwaha
[Sr. Mnanager]

PRAVEEN DUTTA
Digitally signed by PRAVEEN DUTTA
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, ou=PS PEM, postalCode=201301, st=UTTAR PRADESH, 2.5.4.20=da8948aa0c3e2703a98a0aacaa2aedd61dd68dbef4c976429c5c374e3b47b930, cn=PRAVEEN DUTTA
Date: 2021.01.18 17:56:52 +05'30'

Praveen Dutta
[Sr. DGM]

DEBASISA RATH
Digitally signed by DEBASISA RATH
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, ou=BHEL PS PEM Noida, postalCode=201301, st=UTTAR PRADESH, 2.5.4.20=6fa841891eca623b359ef779ae76b0d329ed700f76a80fccab8a422c815ea7fd, cn=DEBASISA RATH
Date: 2021.01.19 10:55:18 +05'30'

Debasisa rath
[DH-Electrical]

PEM / PG-III, BHEL, Noida

SPECIAL CONDITIONS OF CONTRACT (SCC) Rev-0

3 x 800 MW PVUNL PATRATU TPP PHASE-I (Job No. 434)

These Conditions shall be read and construed along with General Conditions of Contract (GCC) rev.06 & GST related Corrigendum to GCC rev.06, to be enclosed along with the tender enquiry. In case of any conflict or inconsistency, the conditions given in SCC shall prevail over the GCC and its corrigendum.

Sl No.	Title	Description
1.	Project Name	3 x 800 MW PVUNL PATRATU TPP PHASE-I (EPC)
2.	Nature of project & Type of Bidding	Non-Mega & ICB (International Competitive Bidding)
3.	Customer Order Ref No	01/PVUNL-CS-9585-001-2/NOA-FC dated 08.03.2018 01/PVUNL-CS-9585-001-2/NOA-SC dated 08.03.2018 01/PVUNL-CS-9585-001-2/NOA-TC dated 08.03.2018
4.	BHEL's Customer	PATRATU VIDYUT UTPADAN NIGAM LIMITED (subsidiary of NTPC Limited in joint venture with JBVNL)
5.	**PVUNL GST No.**	**20AAICP3718K1ZH**
6.	Customer Consultants	No consultant
7.	Consignee Address (Bill To)	For supply package: BHEL, Power Sector-Project Engineering Management, Power Project Engineering Institute, Plot No. 25, Sector-16A, Noida, Uttar Pradesh-201301. **GSTIN: 09AAACB4146P2ZC** **For turnkey packages** (where BHEL-PEM will issue only the LOA and Purchase Order shall be issued by BHEL-PSWR): Construction Manager, BHEL site office, Patratu Vidyut Utpadan Njigam Ltd , PO: PTPS , Patratu , Ramgarh, Jharkhand - 829119 **BHEL PSWR GSTIN No.- 27AAACB4146P1ZF**
8.	Delivery Address (Ship To)	Construction Manager, Bharat Heavy Electricals Limited, Patratu Vidyut Utpadan Njigam Ltd, PO: PTPS , Patratu , Ramgarh ,Jharkhand - 829119
9.	BHEL Site Office Address	Construction Manager, Bharat Heavy Electricals Limited, Patratu Vidyut Utpadan Njigam Ltd , PO: PTPS , Patratu , Ramgarh, Jharkhand - 829119
10.	Location of Plant	Site is Located just outside the coal belt of South Karanpura in Ramgarh District of Jharkhand State. The nearest Railway Station is Patratu which is at a distance of about 4 km on Barkakhana-Barwadih Railway line. **District: Ramgarh (state- Jharkhand)** **Next big cities to site: Ranchi** **Nearest Railway Station: - Patratu** **Nearest Airport: Ranchi (45 km by road from site)**
11.	Mode of Dispatch	Air, Road, Rail & Sea Transportation For indigenous supplies: By Rail/Road on door delivery and freight pre-paid basis. For imported supplies: On C&F basis. Transit Insurance will be in BHEL scope
12.	Road Permit /E-waybill	Road Permit / E-way bill, to be arranged by Supplier/ transporter/ BHEL (as per GOI mandate).
13.	BHEL GSTIN Details	For supply packages: BHEL-PEM is registered in the State of Uttar Pradesh with GSTIN 09AAACB4146P2ZC

Gaurav 08/5/18

		For Turnkey packages: BHEL PSWR GSTIN No.- 27AAACB4146P1ZF
14.	Transit Insurance	In BHEL Scope. For each dispatch, vendor shall inform the following to the Underwriter under intimation to BHEL-PEM and BHEL Site office: (i) Policy No. (ii) Consignee Name. (iii) Consignment Details (items with their weights and value (in INR). (iv) Project Name and P.O. No. (v) LR No. and date, Dispatch origin and destination details, Invoice No. Vendors to intimate the underwriters quoting the insurance Policy No. as mentioned in Purchase Order.
15.	Dispatch intimation	Yes in writing, Not less than 30 (Thirty) days prior to date of shipment and dispatch details to be sent to: BHEL Site office (As mentioned in Sl. No. 9) BHEL PEM Noida (As mentioned in NIT) At the point of dispatch, vendor must furnish docs required as given below through Email / Fax i. Vendor's invoice ii. LR / RR / GR / Courier Receipt iii. Packing List/ Challan indicating the items dispatched (with their weights) iv. Insurance intimation letter informing the underwriters about the dispatches v. MDCC (of BHEL / NTPC) as applicable vi. Photograph of packing / boxes showing dispatch marking as per Sl. No. 26
16.	Document required for Vendor's payment.	**For materials originating from Indian territory** For claiming the payment against dispatch, MRC & Freight, documents as mentioned in GCC rev 06 & its corrigendum shall be submitted by vendor to BHEL. Original money receipt must be submitted for Freight payment. **Packing List** must comply to Clause No. ~~19.3 of General Commercial~~ Terms & ~~Conditions of~~ GCC rev.06. Description of items in packing list shall be as per PO such that proper correlation between PO & packing list must be furnished. Soft copy of documents for claiming payment shall be submitted by vendor as advance copy. **For materials originating from non-Indian Territory** Three (3) original and Three (3) copies of clean bill of lading or One (1) clean original Airway Bill & Three (3) copies, in case of air freight. One (1) original and Three (3) copies of signed Invoices One (1) original and Three (3) copies of Packing List (clearly showing number of packages, gross weight and net weight). Three (3) copies of certificate of country of origin. Copy of MDCC from BHEL / NTPC (as applicable) Three (3) copies of inspection certificate, if any, issued by the customer/his authorized representative. Three (3) of certificate from the vendor to the effect that drawings and catalogues for customs clearance purpose have been kept with the packages for shipment. Three (3) copies of certificate from the vendor to the effect that the contents in each case are not less than that entered in the invoices and guaranteed as new and as per the relevant technical specifications. Shipping Specification – One (1) copy. Quality Certificate – One (1) copy. Approved Test Certificates, if any. - Three (3) copies. Guarantee Certificate – One (1) Original + One (1) copy.

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		Inspection Reports – One (1) Original + One (1) copy. PVC Calculation and copy of all applicable indices, if PVC applicable. – Two (2) copies.
17.	Material Receipt Certificate (MRC)	A) For supply packages- BHEL-PEM will arrange MRC from BHEL site B) For Turnkey (Supply + Erection & Commissioning) – Original MRC duly signed by customer (PVUNL) & BHEL site is to be arranged by Vendor.
18.	Buyer and Paying Authority	For packages where PEM will issue the Purchase Order: **BHEL PEM** will be the paying authority. For packages where BHEL-PEM will issue only the LOA and Purchase Order shall be issued by BHEL-PSWR: **BHEL Patratu Site will be the paying Authority.**
19.	Demurrage charges	Demurrage charges shall be paid by supplier/ vendor only to the transporter. No claim shall be acceptable to BHEL in this regard.
20.	Unloading, Storage & Movement of material at site	a) By BHEL site office for supply packages. b) By vendors for Turnkey i.e. Supply and E&C packages
21.	Concessional custom duty against Essentiality certificate (EC)	The project has been qualified through Project Import route. Accordingly, the benefits applicable to PI project would be granted for this project In this regard applicable documents such as Essentiality certificate will be issued by NTPC (ultimate customer). Under this, Concessional rate of Customs Duty shall be applicable on the Import Contents of the supplier respectively. Based on the above EC, Customs Duty Benefits will be passed on to the vendor. The Bidder to indicate the Import contents i.e. list of the item, Currency of Import and Country of Import including CIF value in their offers. BHEL shall inform, the availability of CIF value for a particular package, if any, at the time of NIT. The benefits availed in Concessional Customs Duty must be passed on to BHEL in their offer. Vendor shall inform BHEL and provide the necessary documents to obtain required certificates from BHEL to avail exemption. Obtaining custom duty benefit in line with the Essentiality Certificate issued shall be in vendor's scope.
22.	Taxes & Duties (For Domestic Vendor)	As per General Conditions of Contract (GCC rev 06) & GST related Corrigendum to GCC rev.06
23. a	Taxes & Duties (For Order Directly to Foreign Bidders)- supply packages	In case of foreign vendors, quoted prices & Dispatches shall be on C & F (Port-Chennai) basis and the Taxes & duties in the country of dispatch shall be borne by Foreign vendor.
23. b	Taxes & Duties (For Order Directly to Foreign Bidders)- Turnkey packages	Complete responsibility of import including (but not limited to) import clearance, all taxes and duties in the country of export (origin), all taxes and duties in India shall be to vendor's account.
24.	Inspection Agency	BHEL/ BHEL approved 3rd party inspection agencies and/or NTPC/ Customer Agency as applicable.
25.	Inspection procedure for Domestic supplies	<u>For Domestic supplies</u> Vendor shall raise inspection call at least 15 business days in advance on BHEL CQS website to applicable inspection agency (as mentioned in PO/LOI or to be informed later) and submit copy of inspection call to BHEL-PEM for arranging NTPC inspection/Joint inspection on the proposed date, as applicable. MDCC shall be issued on the basis of clear inspection report (CQIR). <u>For Foreign supplies</u> In case of Foreign supplies, if NTPC approved 3rd party inspection agency does not participate in the inspection, test certificates & inspection reports duly accepted by the agreed Inspection agency shall be submitted in soft copy to BHEL-PEM. The same shall be reviewed by PEM and then, sent to NTPC for clearance. The dispatch clearance (MDCC) by NTPC/ BHEL as applicable shall be given to the foreign supplier or representative in India after acceptance of above test certificates.

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26.	Packing, Identification & marking [if not specified in NIT]	Each box shall be marked with Capital Letters in "Red" indicating the **PEM SUPPLY (Main Supply/ Commissioning Spares/ Mandatory Spares) for** 3 x 800 MW PVUNL PATRATU TPP. **NOTE:** Main supply item and items for commissioning spares must be packed separately. Each package delivered under the Contract shall be marked by supplier and such marking must be distinct and in English language (all previous irrelevant markings being carefully obliterated). Such marking shall show the description and quantity of contents, the name and address of consignee, the Gross weight and Net weight of the package, the name of the Supplier, PEM P.O. reference number, with a distinctive number of mark sufficient for purposes of identification. Besides above necessary, packing shall bear a special marking `TOP', `BOTTOM', 'DO NOT TURN OVER", "KEEP DRY", "HANDLE WITH CARE", etc **IMPORTANT: -** • Two copies of respective standard manufacturer's erection instruction/operation instruction manual shall be kept in each package / container for immediate reference by BHEL site and same shall be reflected in packing slip also • The Packing list details for the consignment must be put inside the Box/Boxes. Items like pumps, Valves, Hoists, Cranes etc shall essentially have O&M Manuals and E&C guidelines duly enclosed in the packing box. Certificate to such effect shall also be reflected in packing slip. Mandatory spares shall be properly packed separately in separate box painted in Red, indicating **Mandatory Spares in bold letters** and each spare shall be properly tagged giving details i.e. item number of the equipment in line with the CUSTOMER approved BBU for Mandatory spares & Number per item (to match the description given ~~in the packing slip) to facilitate their proper~~ identification by PVUNL/ NTPC. One Copy of Packing list must be put inside the Box along with Manufacturing drawing no. reference, Catalogue reference etc.
27.	Submission of Final Drgs/Docs alongwith O&M Manual, Type Test Certificates (if any)	As per GCC rev.06/ Technical Specification/Kick-off meeting.

	Prepared by	Checked by	Reviewed by	Vetted by	Approved by
Name	Gaurav Garg				16/05/18
Designation	Sr. Engr/ PG III	DGM/ PG III	DGM/ PG III	Finance	AGM & DH/ PG III
Signature	Gaurav 08/5/18				DEEPAK GUPTA

CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन

MAIN CONTRACTOR'S PROPOSAL CUM EVALUATION REPORT

मुख्य संविदाकार प्रस्ताव सह मुल्यांकन रिपोर्ट

Ref No: संदर्भ सं.:			***Date:*** तिथिः		
i.	***Main Contractor*** मुख्य संविदाकार				
ii.	***Project*** परियोजना				
iii.	***Package Name*** पैकेज का नाम		***Package No*** पैकेज सं.		
iv.	***Proposed Item/Scope of Sub-contracting*** उप-संविदा(अनुबंध) का प्रस्तावित मद/ दायरा				
v.	***Item covered under*** *निम्नलिखित के अंतर्गत शामिल मद*	***Schedule-1*** */अनुसूची-* ***1***		***As per contract clause No-*** *अनुबंध के अनुसार खंड सं.--* ***-***	
		Schedule-2 *अनुसूची-* ***-2***			
vi.	***If item is Schedule-1 and proposed sub-vendor is indigenous, Main Contractor to explain how the contractual provisions will be fulfilled*** /यदि मद अनुसूची **-1** है और प्रस्तावित उप-विक्रेता स्वदेशी है, तो मुख्य संविदाकार को स्पष्ट करना होगा कि संविदा/अनुबंध के प्रावधान कैसे पूरे किए जाएंगे				
vii.	***Name and Address of the proposed Sub-vendor's works*** /प्रस्तावित सब-वेंडर का नाम तथा पता				
viii.	***PO placement date/ Start of manufacturing (if self-manufactured) as per L2 network*** **पीओ नियोजन की तिथि / एल-** 2 **नेटवर्क के अनुसार विनिर्माण (यदि स्व-निर्मित है) की शुरुआत**				

ix.	***Item Description (Type/Size/Rating/Scope of Sub-Contracting)*** मद का विवरण (प्रकार / आकार / रेटिंग / उप-अनुबंध का दायरा)	***Total quantity of proposed item envisaged in this package (Nos/ Running Meters/ Kgs/ Tons etc)*** इस पैकेज में परिकल्पित प्रस्तावित मद की कुल मात्रा (संख्या / क्रियाशील मीटर / किलोग्राम / टन आदि)	***Quantity proposed to be procured from proposed sub-vendor (Nos/ Running Meters /Kgs /Tons etc)*** प्रस्तावित उप-विक्रेता (संख्या / क्रियाशील मीटर / किलोग्राम / टन आदि) से खरीदी जाने वाली मात्रा	***Timeline for quantity requirements as per project schedule & whether the proposed Sub-vendor equipped with adequate capacity to supply proposed order quantity in time*** / परियोजना समय सूची के अनुसार मात्रा आवश्यकताओं के लिए समय-सीमा और क्या प्रस्तावित उप-विक्रेता समय पर प्रस्तावित मांग की मात्रा की आपूर्ति करने में पूरी तरह से सक्षम है

x.	***Supply experience of the proposed sub-vendor (including supplies to Main Contractor, if any) for similar item/scope of sub-contracting, for last 3 years (Note:- Only relevant experience details w.r.t. proposed item/scope of subcontracting to be brought out here)*** पिछले **3** वर्षों के लिए उप-अनुबंध के समान मद / दायरे के लिए प्रस्तावित सब-वेंडर (मुख्य संविदाकार हेतु आपूर्ति, यदि कोई हो, सहित) का आपूर्ति अनुभव (नोट: - उप-अनुबंध के प्रस्तावित मद / दायरे के संबंध में केवल प्रासंगिक अनुभव के विवरण का उल्लेख हो

एनटीपीसी NTPC	**CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन** **MAIN CONTRACTOR'S PROPOSAL CUM EVALUATION REPORT** **मुख्य संविदाकार प्रस्ताव सह मुल्यांकन रिपोर्ट**

	Project/Package परियोजना/पैकेज	***Customer Name*** ग्राहक का नाम	***Supplied Item (Type/Rating/Model /Capacity/Size etc)*** आपूर्त्तित मद (प्रकार/रेटिंग /मॉडल /क्षमता/आकार आदि)	***PO ref no/date*** पीओ संदर्भ सं. /तिथि	***Supplied Quantity*** आपूर्ति की मात्रा	***Date of Supply*** आपूर्त्ति की तिथि

We confirm that as per our assessment, the proposed sub-vendor has requisite capabilities & supply experience and is suitable for supplying the proposed item/scope of sub-contracting/हम अपने आकलन के अनुसार इस बात की पुष्टि करते हैं कि, प्रस्तावित उप-विक्रेता के पास अपेक्षित क्षमता और आपूर्ति करने का अनुभव है और उप-अनुबंध के दायरे /प्रस्तावित मद की आपूर्ति के लिए उपयुक्त है।

Name: नाम:		***Desig:*** पद:		***Contact No:*** दूरभाष सं.:		***Sign:*** हस्ताक्षर:		***Date:*** तिथि:	

Company's Seal/Stamp:- कंपनी का मुहर:-

एनटीपीसी NTPC	**CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन** **SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली**

i.	***Item/Scope of Sub-contracting*** **उप-संविदा(अनुबंध) का मद/ दायरा**			
ii.	***Address of the registered office*** पंजीकृत कार्यालय का पता		***Details of Contact Person*** संपर्क व्यक्ति का विवरण ***(Name, Designation, Mobile, Email)*** (नाम, पदनाम, मोबाइल, ईमेल)	
iii.	***Name and Address of the proposed Sub-vendor's works where item is being manufactured*** प्रस्तावित उप-विक्रेता के कार्यों का नाम और पता, जहां मद का निर्माण किया जा रहा है		***Details of Contact Person:*** संपर्क व्यक्ति का विवरण ***(Name, Designation, Mobile, Email)*** (नाम, पदनाम, मोबाइल, ईमेल)	
iv.	***Annual Production Capacity for proposed item/scope of sub-contracting*** **उप-संविदा(अनुबंध)** के प्रस्तावित मद / दायरे के लिए वार्षिक उत्पादन क्षमता			
v.	***Annual production for last 3 years for proposed item/scope of sub-contracting*** **उप-संविदा(अनुबंध)** के प्रस्तावित मद / दायरे के लिए पिछले 3 वर्षों का वार्षिक उत्पादन			
vi.	***Details of proposed works*** **प्रस्तावित कार्यों का विवरण**			
1.	***Year of establishment of present works*** वर्तमान फैक्टरी की स्थापना का वर्ष			
2.	***Year of commencement of manufacturing at above works*** उपरोक्त फैक्टरी में निर्माण कार्य शुरू होने का वर्ष			
3.	***Details of change in Works address in past (if any*** पूर्व में फैक्टरी स्थल में परिवर्तन का विवरण (यदि कोई हो)***)***			
4.	***Total Area*** कुल क्षेत्र			
	Covered Area शामिल क्षेत्र			
5.	***Factory Registration Certificate*** फैक्टरी पंजीकरण प्रमाण पत्र		***Details attached at Annexure – F2.1*** विवरण अनुलग्नक- एफ 2.1 पर संलग्न है	
6.	***Design/ Research & development set-up*** डिजाइन / अनुसंधान और विकास सेटअप ***(No. of manpower, their qualification, machines & tools employed etc.)*** (श्रमिकों की संख्या, उनकी योग्यता, मशीन और उपलब्ध उपकरण आदि)		***Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design)*** ***Details attached at Annexure – F2.2*** ***(if applicable)*** लागू / लागू नहीं, अगर विनिर्माण मुख्य संविदाकार / खरीददार के डिजाइन के अनुसार है) विवरण अनुलग्नक –एफ 2.2 पर संलग्न है। (यदि लागू हो)	
7.	***Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc)*** मैनपावर विवरण के साथ समग्र संगठन का चार्ट(डिजाइन / विनिर्माण / गुणवत्ता आदि)		***Details attached at Annexure – F2.3*** विवरण अनुलग्नक – F2.3 में संलग्न है।	

8.	***After sales service set up in India, in case of foreign sub-vendor(Location, Contact Person, Contact details etc.)*** भारत में बिक्री सेवा की स्थापना के बाद, विदेशी उप-विक्रेता के मामले में(स्थल , संपर्क व्यक्ति, संपर्क विवरण आदि)	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.4*** विवरण अनुलग्नक -2.4 पर संलग्न है ।
9.	***Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any*** फ्लोचार्ट सहित विनिर्माण प्रक्रिया निष्पादन योजना , जिसमें आउटसोर्स प्रक्रिया, यदि कोई हो, सहित कच्चे माल से तैयार उत्पाद तक विनिर्माण के विभिन्न चरणों को दर्शाया गया हो,	***Details attached at Annexure – F2.5*** विवरण अनुलग्नक - F2.5में संलग्न है ।
10.	***Sources of Raw Material/Major Bought Out Item*** कच्चे माल के स्रोत / खरीदे हुए मुख्य मद	***Details attached at Annexure – F2.6*** विवरण अनुलग्नक - F2.6में संलग्न है।
11.	***Quality Control exercised during receipt of raw material/BOI, in-process , Final Testing, packing*** कच्चे माल / खरीदे हुए मद, प्रक्रियाबद्ध, अंतिम परीक्षण, पैकिंग करते समय गुणवत्ता नियंत्रण	***Details attached at Annexure – F2.7*** विवरण अनुलग्नक - F2.7 पर संलग्न है
12.	***Manufacturing facilities*** ***(List of machines, special process facilities, material handling etc.)*** विनिर्माण सुविधा(मशीनों की सूची , विशेष प्रक्रिया सुविधाएं, सामग्री रख-रखाव आदि)	***Details attached at Annexure – F2.8*** विवरण अनुलग्नक - F2.8में संलग्न है ।
13.	***Testing facilities (List of testing equipment)*** परीक्षण सुविधाएं(परीक्षण उपकरण की सूची)	***Details attached at Annexure – F2.9*** विवरण अनुलग्नक – F2. 9 में संलग्न है ।
14.	***If manufacturing process involves fabrication then-*** यदि निर्माण प्रक्रिया में फेब्रिकेशन की गई है तो- ***List of qualified Welders*** पात्र वेल्डर की सूची ***List of qualified NDT personnel with area of specialization*** विशेषज्ञता के क्षेत्र सहित पात्र एनडीटी कार्मिकों की सूची	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.10*** विवरण अनुलग्नक - F2.10में संलग्न है। ***(if applicable)*** लागू / लागू नहीं
15.	***List of out-sourced manufacturing processes with Sub-Vendors' names & addresses*** सब-वेंडर द्वारा बाह्य स्रोतों (उनके नाम और पते सहित)से करवाएं गए निर्माण प्रक्रियाओं की सूची	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure. –F2.11*** विवरण अनुलग्नक - F2.10में संलग्न है। ***(if applicable)*** (यदि लागू हो)
16.	***Supply reference list including recent supplies*** नवीनतम आपूर्ति सहित आपूर्ति संदर्भ सूची	***Details attached at Annexure – F2.12*** विवरण अनुलग्नक - F2.12 में संलग्न है । ***(as per format given below)*** (नीचे दिए गए प्रारूप के अनुसार)

Project/ package परियोजना /पैकेज	***Customer Name*** ग्राहक का नाम	***Supplied Item (Type/Rating/Model /Capacity/Size etc)*** आपूर्ति की गई वस्तु (प्रकार / रेटिंग / मॉडल / क्षमता / आकार आदि)	***PO ref no/date*** पीओ संदर्भ सं. / तिथि	***Supplied Quantity*** आपूर्ति की मात्रा	***Date of Supply*** आपूर्ति की तारीख

17.	***Product satisfactory performance feedback letter/certificates/End User Feedback*** उत्पाद के संतोषजनक प्रदर्शन संबंधी फीडबैक पत्र / प्रमाण पत्र / अंतिम उपयोगकर्ता फ़ीडबैक	***Attached at annexure - F2.13*** अनुलग्नक F2. 3पर संलग्न है

18.	***Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating)*** प्रस्तावित उत्पाद (एक समान या उच्च रेटिंग वाले) के लिए टाइप टेस्ट रिपोर्ट (टाइप टेस्ट विवरण, रिपोर्ट संख्या, एजेंसी, जांच की तारीख) का सारांश नोट: - रिपोर्ट प्रस्तुत करने की आवश्यकता नहीं है ***Note:- Reports need not to be submitted***	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.14*** विवरण अनुलग्नक - F2.1 4में संलग्न है ***(if applicable)*** (यदि लागू हो)
19.	***Statutory / mandatory certification for the proposed product*** प्रस्तावित उत्पाद के लिए वैधानिक / अनिवार्य प्रमाणीकरण	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.15 (if applicable)*** (यदि लागू हो)
20.	***Copy of ISO 9001 certificate*** आईएसओ 9001 प्रमाण पत्र की प्रति ***(if available***(यदि उपलब्ध हो)	***Attached at Annexure – F2.16*** अनुलग्नक में संलग्न - F2.1 6 है
21.	***Product technical catalogues for proposed item (if available)*** प्रस्तावित मद के लिए उत्पाद तकनीकी कैटलॉग (यदि उपलब्ध हो)	***Details attached at Annexure – F2.17*** विवरण अनुलग्नक - F2.1 7 में संलग्न है

Name: ***नाम:***		***Desig:*** ***पद:***		***Sign:*** ***हस्ताक्षर:***		***Date:*** ***तिथि:***	

Company's Seal/Stamp:- कंपनी की मुहर / मोहर: -

Guidelines for Remote Inspection of PEM BOIs

1) OBJECTIVE:

To lay down the procedure for carrying out Remote Inspection of Bought-out Items (BOIs) for PEM suppliers wherever applicable.

2) SCOPE:

It will cover suppliers for packages of PEM BOIs for various project requirements.

Invitation is sent to the suppliers for remote inspection on applications like MS Teams, Webex, etc. by BHEL.

3) MINIMUM REQUIREMENTS AT SUPPLIER'S WORKS:

i. Uninterrupted internet services

ii. Good internet bandwidth (Min 100 Mbps)

iii. Good resolution camera (2 nos) – one preferably CCTV (static at one place) and one hand hold (moving)

iv. Smart phone with minimum 8MPi camera front and back both with optical zoom facility suitable for using web applications like Webex, MicroSoft (MS) Teams, etc.

v. Computer and Scanner with good resolution

vi. Digital signatures of supplier's Quality Engineer

vii. Availability of web applications like Webex, MicroSoft (MS) Teams, as required.

viii. All Test certificates, internal test reports, calibration reports, etc. for the items offered for inspection.

ix. Availability of the above to be submitted to BHEL two days in advance before inspection.

x. Dedicated team from supplier side for facilitating inspection requirements.

xi. For ensuring proper visibility, the suggested Portable lighting sources (torch/ electric LED bulb of minimum 15 W) with no glare is to be ensured at offered job, location for remote inspection/testing. This is to be verified before start of the inspection.

xii. The GPS location co-ordinates or any method to locate inspection location shall be captured indicating the location of the Vendor-Premises of remote inspection/testing.

4) MINIMUM REQUIREMENTS AT BHEL and CUSTOMER LOCATION :

i. Uninterrupted internet services

ii. Suitable internet bandwidth

iii. Digital signatures wherever required.

iv. Availability of web applications like Webex, MS Teams, etc. as required.

v. Clearance from customer for conducting remote inspection

5) PROCEDURE:

i. Supplier will raise the inspection call in BHEL - CQIR portal.

ii. Supplier shall ensure availability of minimum requirements at supplier's works as mentioned above at point 3.

iii. Before starting the inspection, the supplier shall submit the documents (TCs, internal test reports and calibration certificates as per approved QAP) two days before the date of inspection for review by BHEL and supplier shall coordinate with BHEL and if found satisfactory, inspection shall be considered for remote.

iv. Prior to commencement of remote inspection a pre inspection meeting shall be organised by BHEL inspector with supplier to ascertain the readiness for remote inspection.

6) During inspection, supplier shall share the location on Google maps for verifying the address of the manufacturer. Location may be captured by BHEL as screenshot.

i. Inspection shall be on the basis of approved Quality Plans and associated reference documents mentioned.

ii. For witnessing inspection, supplier shall bring the mobile video camera near to the surface of the equipment or as per requirement of the inspector for clarity in viewing the test/ equipment which shall be the responsibility of supplier. Supplier shall ensure that proper lighting in available during live video streaming.

iii. Before start of the inspection, inspector shall ensure that all instruments shall have valid calibration report. Supplier shall ensure use of digital instruments preferably for inspection to the extent possible.

iv. Details of suppliers's dedicated team handling the remote inspection shall also be incorporated in the CQIR.

v. All details of inspection/ testing referred documents shall be mentioned in the CQIR. Recording of remote inspection shall be maintained by the BHEL inspector and this recording (unedited) shall be maintained at BHEL system for a minimum period of 3 years or till the warranty period whichever is later.

vi. PEM (Engineering) shall accord final technical clearance, in case of any deviation in inspected item noticed during inspection.

vii. Inspection shall be conducted by PEM-Q&BE assigned inspector along with PEM-Engg (if required). CQIR shall be prepared and maintained by PEM-Q&BE.

viii. PG will issue MDCC on the basis of acceptance of inspected items along with accepted packing photographs as per contract provisions.

7) **UNDERTAKING BY VENDOR:** Material inspected through remote inspections is meeting all technical requirements of BHEL. In case of any discrepancy from the above procedure/ material inspected, if found later, vendor will replace the materials without any cost implication to BHEL.

8) Vendor shall provide the signed and stamped of the above guidelines to BHEL as a token of acceptance.

Letter head of Company (<Rs. 10 Cr value)

Ref…… Date…….

To,

Bharat Heavy Electricals Limited PEM,

PPEI Building, Plot No 25, Sector -16A,

Noida (U.P)-201301

Subject: -Certification regarding local content

Reference: Tender Enquiry No-……

Name of Package: ……..

Dear Sir,

We hereby certify that items offered by us of ……..(package name)…….……for……(Project Name/Rate contract)…….. meets the requirement of minimum local content in line with Cl. No……. of NIT No……. dated……. and the Public Procurement (Preference to Make in India), Order 2017 dated-15.06.2017, 28.05.2018, 29.05.2019 , 04.06.2020 &16.09.2020.

Local Content- .....%

We further confirms that details of location at which the local value addition is made will be our registered works at ……(address of the works)

Yours very truly

……..(authorized signatory of company)

……..(firm name)